

AN ORTHOPTEROLOGICAL RECONNOISSANCE OF THE SOUTHWESTERN
UNITED STATES. PART III: CALIFORNIA AND NEVADA.

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The first and second portions of the results of this examination of the southwestern United States, treating of Arizona, New Mexico and western Texas material, have already been published in these PROCEEDINGS.¹ The present is the final one of the series, bringing to a close the study of the collections made in 1907.

The material treated in this paper was almost wholly collected by the junior author, although several small but interesting lots taken by Dr. Joseph Grinnell and Mr. Fordyce Grinnell, Jr., have added materially to the interest of the work. The collections made by these gentlemen were very kindly given by them to the Academy. Mr. Otho Poling, of Quincy, Illinois, whose assistance was acknowledged in the previous papers, aided in securing a good portion of the material taken in the Los Angeles region (Alamitos Bay, Miramar, Pasadena, Echo Mountain and Mt. Lowe), while collections made by him in late August near Los Angeles, at Altadena and on Mt. Lowe contain much of interest.

The number of species examined and treated in this report is one hundred and ten, of which six species and two subspecies prove to be new, while the specimens number one thousand eight hundred and seventy.

LOCALITIES.

Indio, Riverside County, California. Altitude, 26 feet below sea-level; July 29, 1907. Orthoptera were found plentiful near the town on the sun-baked plain, upon which grew a high dense growth of plants, and also in small irrigated spots near the railroad station. The intense heat made collecting rather difficult.

Alamitos Bay, Los Angeles County, California. July 31. Near the ocean beach on the loose sand, upon which typical beach vegetation was growing, some few species of Orthoptera were found. In a few damp spots in this situation several specimens of the genus *Stethopneuste* were taken.

¹ *Proc. Acad. Nat. Sci. Phila.*, 1908, pp. 365-402; 1909, pp. 111-175.

Miramar, Los Angeles County, California. July 31. In this locality a field of dry trampled grass near the shore proved the most productive location. On the whole collecting near the shore was not nearly as good as it was farther inland near the hills.

Pasadena, Los Angeles County, California. Altitude, 824 feet; August 1. A good lot of material was secured in the Arroyo Seco, where in the heavy brush and cactus and also beside the stream a number of interesting species were encountered. Nearby in cultivated ground collecting was also productive. On the nearer slopes of the San Rafael Hills quite a different and nearly as interesting a series of Orthoptera was taken. These hills were covered with low dry grasses, with frequent dense tangles of low bushes between them. This vegetation and the steepness of the slopes made collecting much more difficult than in the Arroyo Seco.

Between Altadena and Rubio a very few specimens were taken on August 8, among low bushes.

Echo Mountain, San Gabriel Range, Los Angeles County, California. Altitude, 2,700–3,500 feet; August 8. On the steep slopes covered with dense but low bushes a few interesting specimens were taken in a short time.

Mt. Lowe, San Gabriel Range, Los Angeles County, California. Altitude, 5,200–5,600 feet; August 8. Between Alpine and the summit the steep mountain side is clothed with heavy shrubs and low oaks, while the ravines in places are filled with tall trees. On the mountain side collecting was most productive and interesting, but in the ravines only a few Melanopli were found.

Between Echo and Alpine, altitude 4,000–4,800 feet, the mountain slopes proved splendid collecting places, especially where there was an occasional small pocket or basin. In one of these nearly level areas *Napaia gracilis*, *Dracotettix californicus* and other very interesting species were found. The mountain sides are in the majority of places clothed with manzanita and other low bushes.

Santa Catalina Island, Los Angeles County, California. August 3–7. On Catalina Island the slopes of the hills about Avalon, which are covered with low bushes and weeds and an occasional thick clump of stunted oaks, proved quite unproductive. On the golf course farther up in the Avalon Valley, certain common species were abundant and toward dusk several species of Locustids and crickets were heard in some cultivated bushes about the club house and about the town. Of these specimens of *Æcanthus* and *Scudderia* alone were captured.

A trip to the highest point on the island involved considerable effort with little result.

Collecting at Catalina was much like that among the low hills along the coast and not nearly as good as among the San Gabriel foothills.

Cottonwood, San Bernardino County, California. Altitude, 2,274 feet; September 9. On the desert clothed with greasewood and other plants of the Mohavan region collecting was very productive, especially at dusk when a number of interesting things were taken. The desert is here more or less rolling and the spot is ideal for collecting in a dry region. Nearby along the border of the Mohave River, in tall weeds and grassy ground which had been inundated but was at the time parched, a number of interesting species were found. On the train at night species of *Homæogamia* and *Stagmomantis* were taken, two of which are new. On the whole, this was the most interesting desert situation in which collecting was done during this trip.

Kelso, San Bernardino County, California. Altitude, 2,118 feet; August 12. In this the most extremely arid desert area encountered, covered only with a scattered growth of greasewood and a very few low desert plants, quite a few specimens were taken. North from the station, among the volcanic foothills of the North Range of the Providence Mountains, a very few specimens were captured, but these were the most interesting captures made at this point. *Pæcilotettix sanguineus* was seen but not taken. Kelso is situated seven miles from the huge shifting sand hills called the Devil's Playground, and near it is a dry soda lake. A visit to that area would doubtless have proved interesting, but time was not available.

Cima, San Bernardino County, California. Altitude, 4,192 feet; August 12. Cima is situated on a high plateau covered with tall tree yuccas. The low vegetation was scant and consisted of a very few greasewood bushes and other species of desert shrubs. In some nearby low hills covered with essentially the same vegetation long search failed to disclose any species of special interest. In a growth of tumble-weed beside the railroad all the specimens of *Ageneotettix australis* and *Cordillacris apache* were taken.

Lyons, San Bernardino County, California. Altitude, 2,850 feet; August 11. In an area of loose sand with scattered tufts of dry grass *Heliastus minimus* alone was found. The desert here was covered with fragments of volcanic rock, among which greasewood and a very few other desert plants grew and the entire country had a decidedly baked appearance. In this area a number of very valuable captures were made, although it was insufferably hot, much more so than at Yuma.

Bird Spring Mountains, McCullough Range, Lincoln County, Nevada. Altitude, 2,900–3,000 feet; August 11. On the slopes up to the foothills of these mountains the character of country and vegetation was much the same as about Lyons, California, nearby, except that the volcanic fragments were here much more abundant. *Tytthotyle maculata* was found here also, and the single specimen of *Drymadusa arizonensis* taken on this trip was found just where the slopes reached the plain.

Las Vegas, Lincoln County, Nevada. Altitude, 2,050 feet; August 9, 10. Most of the material from this locality was taken in the only green place for many miles around, along the small stream which springs out of the desert to the north of Las Vegas. A good series was also captured on the surrounding desert, which differed from the usual desert of the Southwest in that there was no greasewood and hardly any mesquite to be found. In some spots this desert was excessively parched and barren. Las Vegas, offering both desert and damp land collecting, was more productive than the majority of places in this character of country.

El Toro, Orange County, California. August 20. Collecting was found to be unproductive in the rolling grain fields about the village, which were very dusty and warm at this season.

Tia Juana, San Diego County, California. August 16. The low hills, covered with scant vegetation, and a swampy section near the Mexican boundary line were examined.

Coronado Beach, San Diego County, California. August 14, 15 and 16. Salt marsh, strand and weed field situations were examined at this locality and at South Coronado Beach.

Raymond, Madera County, California. Altitude, 940 feet; September 3. In a hillside stubble field near the village Orthoptera was found in quantities. The Decticid *Clinoppleura minuta* was particularly abundant. The town is not as far out in the valley as Merced, and collecting between this place and Miami would without doubt have proved extremely productive had more time been available.

Merced, Merced County, California. Altitude, 173 feet; August 30. All of the Orthoptera captured at Merced were taken in a very dry stubble field near the railroad station.

Summit House, Madera County, California. Altitude, 2,200 feet; September 3. In this vicinity specimens of interest were taken on a hillside covered with a scattering growth of oaks. The undergrowth here consisted of a thick mat of short dry yellow grasses interspersed with very low tar weed.

Miami, Mariposa County, California. Altitude, 4,200 feet; September 3. A few specimens were taken on a hillside in a conifer forest.

Ahwahnee, Madera County, California. Altitude, 3,700 feet; September 3. In a large patch of tar weed and other high plants collecting was found to be extremely productive, and several species were found which had not been met with in the higher parts of the Sierras. Had more time been available there is but little doubt that a very interesting series could have been taken. This was by far the best locality for collecting between Wawona and Raymond.

From the Yosemite Valley to the Mariposa *Sequoia* grove the roads are bordered by great open conifer forests, in which *Trimerotropis fallax* and *Trimerotropis cæruleipes* were found almost invariably plentiful. In this region collecting was done at Wawona, altitude 4,000 feet, September 1; at Mariposa Grove, altitude 7,000 feet, September 2; at Grouse Creek, altitude 6,000 feet, September 1, and at Eight Mile Camp, altitude 5,000 feet, September 1. All of these localities were much the same for collecting.

Sentinel, Yosemite Valley, Yosemite National Park, California. Altitude, 4,000 feet; August 31–September 1. In the heavy grass near the hotel Melanopli were found in small numbers, while on the opposite side of the Merced River many more were taken in a similar location. In the pine woods of the valley bottom several species of *Trimerotropis* were taken, and in one clearing dotted with low bushes, in the direction of the Yosemite Falls, a series of *Trimerotropis koebelei* was taken. At a higher elevation among the conifers growing on the walls of the valley *Aglaothorax sierranus* was found, as well as the ever present *Trimerotropis fallax* and *Trimerotropis cæruleipes*, and on the steep upper ledges of bare rock near the upper part of the valley wall *Circotettix shastanus* was discovered.

El Portal, Mariposa County, California. Altitude, about 3,200 feet; August 30. This is the terminus of the railroad in the gorge of the Merced, near the entrance of the Yosemite National Park. At this point the rather steep sides of the gorge are clothed with a heavy forest of oaks and other deciduous trees mingled with some few conifers. Few but interesting specimens were taken in the undergrowth, particularly *Melanoplus ablutus* and *Cyrtophyllicus chlorum*. A longer stay would have proved very productive.

Mill Valley, Marin County, California. Altitude, 300 feet; August 23. A few specimens of the genus *Conocephalus* were taken among weeds growing in the street ditches. Just outside of the town on the

grassy slopes, which ascend farther back to Mt. Tamalpais, several very interesting species of *Melanoplus* were found among numerous more common Orthoptera. The region was dry and dusty and much like the other low dry grass-covered hills of the coast.

Mt. Tamalpais, Marin County, California. Altitude, 1,500–2,500 feet; August 23. On the summit but little Orthoptera was to be found among the manzanita and other low shrubbery. A fog continually driving across the mountain top during my stay no doubt prevented a larger number being taken. Near the upper level of the timber a colony of *Neduba* was found in a grassy ravine with a scattered growth of pines, oaks and other trees. From this point downward, collecting among the grasses and herbs beside the railroad track was rather productive, but the mountain ridges covered with manzanita bushes and low herbs revealed Orthoptera in numbers, among which were some very interesting species. The slopes were usually steep, and collecting seemed both more convenient and more productive on the ridges and occasional small level spots. Just below the central portion of this manzanita-covered zone proved the most productive altitude.

The material collected by Dr. Joseph Grinnell was all taken during a biological survey of the San Bernardino Mountains,² the greater proportion of the specimens being taken on the South Fork of the Santa Ana River. The specimens given by Mr. Fordyce Grinnell, Jr., were secured at several localities in the San Jacinto Mountains, and their eastern spur the Santa Rosa Mountains, on Mt. Wilson, San Gabriel Mountains and at Pasadena. The material from the San Bernardino, San Jacinto and Santa Rosa ranges was of exceptional interest, as little or nothing was known of them orthopterologically. The latter is also true of the material taken by Hebard in the Bird Spring Mountains, at Cima, in the North Range of the Providence Mountains and at Las Vegas, Nevada.

FORFICULIDÆ.

Anisolabis annulipes (H. Lucas).

Three males of this species were taken at Coronado Beach, August 15, from under marigolds in a garden.

Caudell has recorded this species from California.

² The Biota of the San Bernardino Mountains, by Joseph Grinnell, *Univ. of Cal. Publ., Zool.*, V, No. 1.

BLATTIDÆ.

Ischnoptera consobrina Saussure.

A single male of this species, collected at Pasadena by Fordyce Grinnell, Jr., has been examined.

The only previous record of the species from the Pacific States is that of its occurrence at Claremont, Los Angeles County, California, by Baker,³ the material having been determined by the senior author.

Homœogamia erratica Rehn.

A single male of this species was taken September 9 at Cottonwood on board a train, to which it had been attracted by the lights. The specimen is paler than a number of Arizona individuals, having practically no markings except an arcuate reddish line meso-caudad on the pronotum.

This is the first record of the species from California.

Homœogamia subdiaphana mohavensis n. subsp.

Four males of an extremely pale form of *H. subdiaphana*, Scudder, previously known only from several localities in New Mexico, were taken at Cottonwood, September 9, under similar conditions to the individual of *H. erratica* recorded above.

These specimens are very pale cream-buff in base color, the tegminal veins pencilled with burnt umber, those of the anal area, which are strongly lined in the typical form, being hardly more defined than those of the proximal portion of the discoidal area. The pronotum is clouded caudad with ochraceous, particularly on the paired lateral and single caudal areas which are dragon's blood red to bay in the typical form.

Two forms of pronotum are noticed in the series of *H. subdiaphana* and *H. s. mohavensis*, one with the cephalic margin distinctly obtuse angulate, the other with the same portion broadly arcuate.

Measurements.

Length of body,	10.5 mm.
Length of pronotum,	3 "
Greatest width of pronotum,	4.2 "
Length of tegmen,	14 "

MANTIDÆ.

Litaneutria minor (Scudder).

A single female from Cottonwood, September 9, taken on greasewood, was actively climbing and jumping about. In size and pale

³ *Invertebrata Pacifica*, I, p. 72.

general coloration it is similar to two specimens from Florence, Arizona. The subbasal fuscous spot on the tegmina is moderately distinct, but not large.

***Litaneutria skinneri* Rehn.**

A single male of this species, collected at an elevation of 5,500 feet on the Santa Ana River, San Bernardino Mountains, California, by Dr. Joseph Grinnell, has been examined. It is inseparable from typical material from the Huachuca Mountains, Arizona.

This is the first record of the species from California.

***Stagmomantis californica* n. sp.**

Types: ♂ and ♀; Cottonwood, Mohave Desert, San Bernardino County, California. Attracted to light. September 9, 1907. [Hebard Collection.]

Allied to *S. fraterna*, *montana* and *venusta* Saussure and Zehntner and *gracilipes* Rehn. From *fraterna* it differs in the slenderer pronotum, particularly the shaft, more prominent eyes, differently colored wings in both sexes and longer pronotum and cephalic femora and shorter tegmina in the male; from *montana* in the much smaller size, proportionately longer and slenderer pronotum and much broader head and differently colored wings; from *venusta* in the more truncate and less arcuate occiput, the less pyriform eyes when viewed from the side, the absence of black markings from the internal face of the cephalic femora in the male, in the stigma being distinctly colored as in the female; from *gracilipes* in the shorter pronotum with the supra-coxal region more dilated and in the shorter limbs, the cephalic femora being much broader and heavier.

The species is in no way related to *S. heterogamia* Saussure and Zehntner, and differs from *S. carolina* in the different proportions of the head and pronotum, the coriaceous costal field of the tegmina of the male and in the stigma not being distinctively colored in the same sex; from *S. limbata* it differs in the smaller size, proportionately broader head, more prominent eyes, slighter pronotum (particularly in the female) and the shorter and narrower tegmina of the female.

Form moderately slender; size medium. Head quite broad, the depth contained one and one-half (♀) to one and two-thirds (♂) times in the width; occipital outline nearly straight, not arcuate; facial scutellum with the greatest depth (median) contained slightly more than twice in the width, dorsal margin obtuse-angulate, very slightly fissate at the angle in the male, the lateral portions of the angle slightly arcuate-emarginate ventrad of the insertion of the antennæ; ocelli

placed in a triangle, two dorsad, one ventrad, the dorsal ones well separated, those of the female quite small compared with the large jewel-like ocelli of the male; eyes large, quite prominent, very broad elliptical in shape when seen from the side, not elevated dorsad of the occipital line; antennæ setaceous in both sexes, slenderer and shorter in the female than in the male. Pronotum slightly longer than twice the width of the head, the supra-coxal width contained four (σ^7) or three and a half (φ) times in the length of the pronotum; shaft considerably compressed mesad, the whole shaft carinate, the expansion and collar pyriform, broadly (φ) or narrowly (σ^7) so, margins of the male unarmed, rather strongly denticulate cephalad in the female, the teeth becoming weaker caudad until absent from the caudal portion. Tegmina of the male very slightly exceeding the apex of the abdomen, hyaline with the rather narrow costal field opaque and sub-coriaceous; tegmina of the female about equal to the pronotum in length and reaching about to the middle of the abdomen; costal margin considerably arcuate proximad; the costal field slightly more than a fourth the width of the whole tegmen; apex rounded; stigma distinct, longitudinal. Wings hardly exceeding the tips of the tegmina. Supra-anal plate of the male transverse, the apical margin regularly but not very greatly arcuate; subgenital plate of the male moderately produced, the apical margin very narrowly and angularly emarginate; cerci slightly exceeding the apex of the subgenital plate, tapering, the joints elongate sub-moniliform; supra-anal plate of the female strongly transverse, the margin rotundato-angulate; subgenital plate compressed, rostrate caudad; cerci about three-fourths

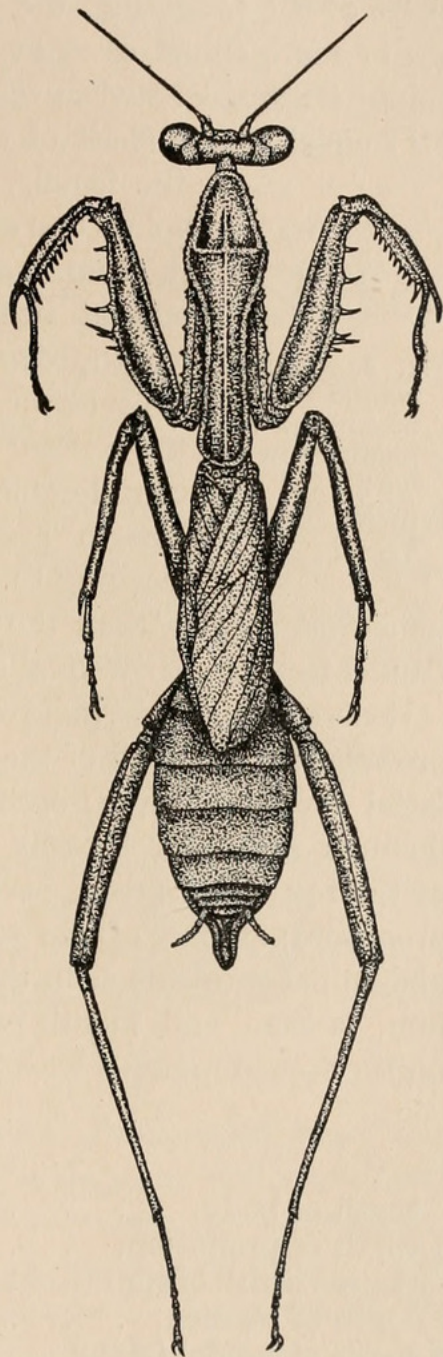


Fig. 1.—*Stagmomantis californica*
n.sp. Dorsal view of female
type. ($\times 2\frac{1}{2}$.)

the length of the subgenital plate, moderately tapering, rather blunt. Cephalic coxæ distinctly (σ) or very slightly (ϕ) shorter than the shaft of the pronotum, the cephalic margin of the same armed with six or more spines of rather uniform size, with a few much smaller spines scattered between them; cephalic femora nearly (σ) or quite (ϕ) equal to the shaft of the pronotum in length, rather heavy in

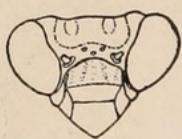


Fig. 2.—*Stagmomantis californica* n. sp. Cephalic view of head of female type. ($\times 4$.)

the female, armed on the external margin with five spines one of which is small and genicular in position, internal margin with fourteen to fifteen spines of several sizes, alternating more or less regularly in length, discoidal spines four in number; cephalic tibiae about half the length of the femora, armed on the external margin with eight spines which leave a considerable unarmed proximal diastema, internal margin armed with twelve spines; cephalic tarsi reaching to the base of the femora. Median femora somewhat shorter than the shaft of the pronotum; tibiae subequal. Caudal femora nearly equal to the pronotum in length; tibiae subequal.

General color of the male cream-buff, with the pronotum very faintly brownish; costal field of the tegmina chalky-white; eyes mars brown; facial scutellum drab; ocelli clear orange-red; proximal dorsal abdominal segments broadly edged with seal-brown, General color of the female oil green, becoming reddish-brown on the shaft of the pronotum; stigma of the tegmina buff, brownish caudad; proximal abdominal segments as in the male; eyes walnut brown; facial scutellum, labrum and mouth parts pale tawny; cephalic femora edged on the spined margins with yellowish.

Measurements.

	σ	ϕ
Length of body,	45.5 mm.	46.5 mm.
Length of pronotum,	13.5 "	16.5 "
Greatest width of supra-coxal expansion,	3 "	4.5 "
Length of tegmen,	32 "	17 "
Length of caudal femur,	9.5 "	12.5 "

An additional paratypic male has been examined, as well as a male from Kelso (VIII, 12; attracted to light), a female from North Range, Providence Mountains (VIII, 12), and one from Pasadena (F. Grinnell, Jr.; Coll. A. N. S. Phila.). There is a slight amount of variation in size and considerable in color. The extra Cottonwood male is similar to the type, but the Kelso individual of that sex is red-brown with the limbs annulate with buffy and the costal half of the tegmina sprinkled

with small ashy blotches. The Providence Mountains female is similar to the type but paler, inclining toward emerald green, with the brownish on the pronotum reduced.⁴ The Pasadena individual is in a brownish phase corresponding to that of the Kelso male, the limbs being more (particularly the cephalic) or less annulate with buffy, the tegmina entirely sprinkled with small creamy-white maculations and the stigma marked.

At Cottonwood all the specimens were attracted to the lights of the train, the individual taken at Kelso having been captured in a similar manner, while in the North Range of the Providence Mountains the species was taken on green desert weeds.

PHASMIDÆ.

Parabacillus coloradus (Scudder).

A broken specimen of this species, taken at Pasadena, California, by Fordyce Grinnell, Jr., has been examined. The right cephalic limb is aborted, the whole regenerated leg being but little longer than the head. The only previous exact Californian record of the species is of its occurrence at Elsinore, Riverside County.

ACRIDIDÆ.

Acrydium granulatum Kirby.

A single adult male and three nymphs of this northern species were taken in tall grass in meadow land at Sentinel, Yosemite National Park, August 31. When compared with material from Michigan the adult specimen is found to be inseparable. This is the first record of the species from California.

Paratettix toltecus (Saussure).

A series of seven males and nine females of this species were taken at Las Vegas, August 10, in a grassy well-watered strip along a stream. A single female was also taken at Cottonwood, September 9, on dry grassy ground along the course of the Mohave River. These specimens are quite uniform in size, the males of course smaller than the females, while the color varies from a blackish-brown base color to one of deep dull maroon-red; the paired blackish triangles placed caudad of the greatest width of the pronotum are present more or less distinctly on all but one of the specimens. This one, a male, has a broad medio-longitudinal bar of dull ochraceous present from the fastigium to the apex of the pronotum, this margined laterad at the greatest width with blackish-brown.

⁴ This color is probably due to discoloration in drying.

This is the first record of the species from Nevada and the second with exact data from California, Riley having recorded it from Panamint Valley, Inyo County.

Morsea californica Scudder.

This very interesting Eumastacid was found on manzanita bushes (*Arctostaphylos tomentosa*), at elevations of from 5,200 feet to 5,600 feet on Mt. Lowe, August 8, where a series of two presumably adult males, three females and six immature specimens was taken. A single female was also taken at an elevation of 3,200 feet on Echo Mountain, while a male from 5,000 feet on Mt. Wilson, taken September 15, by Fordyce Grinnell, Jr., is also before us.

From the original measurement given by Scudder, "length of the body and of the hind femora 9 mm.," it would appear that the types are immature, as a pair from Mt. Lowe, which we judge to be adults, measure as follows:

	♂	♀
Length of body,	12 mm.	16.5 mm.
Length of pronotum,	2.2 "	2.7 "
Length of caudal femur,	10 "	11 "

There is little variation in size in the adult specimens, the Echo Mountain female, however, being slightly smaller than the others of that sex.

In color the adults show little variation, the general tone of the female being dull blackish brown dusted with grayish with the limbs irregularly annulate with very dull grayish, except the caudal tibiae which are mottled; the general color of the males is usually more warm brown on the dorsum, with a narrow median dark-brown line on the pronotum and much broader, poorly defined postocular bars of the same color, the limbs annulate as in the females, and in two of the specimens the whole surface is much dusted with hoary. The postocular bars of the male are sometimes continued on the sides of the abdomen, and in the Echo Mountain female indications of these bars are also present. A pale edging to the ventral margin of the lateral lobes of the pronotum is present more or less distinctly and of varying width in a number of the adults. The immature specimens are much more uniformly red-brown than the adults, although one, a female, has the coloration of adults of that sex.

No traces of tegmina or wings are apparent.

These insects were usually to be found perched on the upper portions of the manzanita bushes. They were found to be very active with saltatorial powers much developed, added to which their small size

would have made them very difficult to capture, had they not almost invariably alighted in an exposed position. As they were constantly alert, the only successful way to capture them was by a quick sweep of the net. The types of the species came from the Cahon Pass and Mt. Wilson.

Morsea californica tamalpaisensis n. subsp.

Types: ♂ and ♀; Mt. Tamalpais, Marin County, California. August 23, 1907. [Hebard Collection.]

A series of thirteen adult males, two females and four nymphs of a small form of *M. californica* were taken on the slopes of Mt. Tamalpais, at elevations of from 1,500 to 2,100 feet, on August 23.

This geographic race differs from the typical form from the Sierra Madre of southern California in the angle of the vertex being slightly more protuberant and more decidedly acute-angulate when seen from the side, in the antennæ being somewhat more expanded distad, in the male cerci being slightly more robust and shorter, in the caudal margin of the pronotum being more decidedly angulate-emarginate and in the general size being smaller.

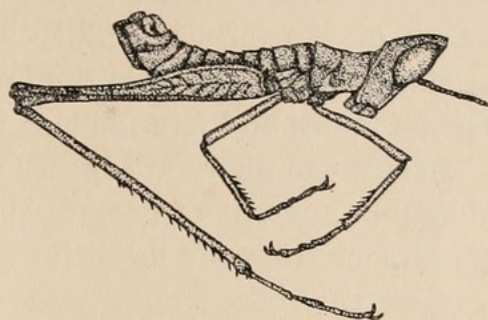
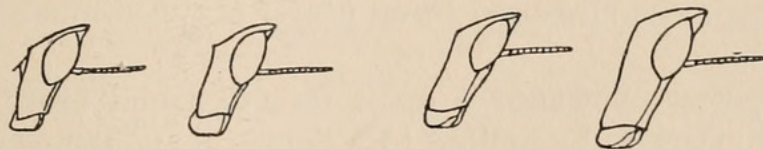


Fig. 3.—*Morsea californica tamalpaisensis* n. subsp. Lateral view of male type. ($\times 3$.)

Measurements.

	♂	♀
Length of body,	10 mm.	14 mm.
Length of pronotum,	2 "	2.2 "
Length of caudal femur,	8.2 "	9 "

The coloration is much as in the typical form, the nymphs being ochraceous-red, one adult female also being decidedly ochraceous.



Figs. 4-7.—Lateral views of heads of male (4) and female (5) of *M. californica tamalpaisensis* and of male (6) and female (7) of *M. californica*. ($\times 3\frac{1}{2}$.)

These reddish individuals were captured on manzanita (*Arctostaphylos* sp.), with the bark of which they are uniformly colored.

The habits of this subspecies were essentially the same as those of the typical form. The insects were always more abundant on the bushes along the summits of the ridges.

Paropomala pallida Bruner.

This species, which appears to be rather generally distributed over the Mohave, Colorado and Gila Deserts in suitable environments, was taken at Cottonwood, Cima, in the foothills of the Bird Spring Mountains, California and Nevada, at Lyons, Nevada, and Las Vegas, Nevada. At Cottonwood, September 9, seven males and one female were taken from dry vegetation along the wash of the Mohave River, where the species was very plentiful. At Cima, August 12, a single female was captured, while in the Bird Spring Mountains and at Lyons, August 11, the species was found in patches of dry high grass growing in deep sand, two males and four females being taken at the former locality and two females at the latter. Grassy spots in the desert were the haunts of the insect at Las Vegas, where eleven males and five females were taken on August 10.

In size the males are rather uniform, but the females exhibit a considerable amount of geographic and some slight individual variation. Specimens from the localities represented measure as follows:

	Length of body. mm.	Length of pronotum. mm.	♂ Length of tegmen. mm.	Length of caudal femur. mm.
Cottonwood, Cal.,	18.5	3	13	9.2
Bird Spring Mts., Cal., . . .	19.2	3.2	15.2	9.6
Las Vegas, Nev.,	20.5	3.7	14.9	9.8
			♀	
Cottonwood, Cal.,	28.8	4.9	20.5	13.5
Cima, Cal.,	27	4	19	12
Bird Spring Mts., Nev., . . .	36.5	6	26.5	15.3
Lyons, Nev.,	30.5	4.8	21.5	13
Las Vegas, Nev.,	34	5.5	22	14.5

The series from the Bird Spring Mountains and Las Vegas exhibit a considerable amount of individual variation in size in the female sex, the specimens measured being nearer the maximum size in each lot.

In color, after allowance is made for green and brownish phases, variation appears to be limited to a lightening of the general shades in some specimens and a general intensification in others. The Cottonwood and Lyons females are in the greenish phase, but the color is decidedly yellowish with a suppression of the lateral bars, which latter is absolute in all the Bird Spring Mountains females and several from Las Vegas. Three of the Bird Spring Mountains females are uniform gall stone yellow, the other one uniform light green with the tegmina yellowish and antennæ brownish. One of the Las Vegas

females is similar to the latter, and another from the same locality closely approaches it. Two of the Las Vegas females are light brownish much suffused on the head, pronotum and caudal limbs with hoary white, the lateral bars very weak in two specimens. The single Cima female is most peculiarly colored, being umber brownish with the lateral bars marked, but the whole surface except the abdomen is more or less clouded and washed with rather weak hoary white. The males are quite uniform in color compared with the females, all being in the green phase, the lateral bars prominent except in one specimen. The color of the antennæ is subject to a considerable amount of variation, and often irrespective of phase, being brownish, yellow or orange.

The species has previously been recorded from Indio, California, and erroneously as *P. virgata* from Yuma, Arizona; between Yuma and Gila Bend, Arizona, Palm Springs, Cahon Pass and Lancaster, California.

***Boötettix punctatus* (Scudder).**

As recently shown by Caudell,⁵ Scudder's *Gymnes punctatus* is really a species of *Boötettix*, related to, but quite distinct from, the type species *B. argentatus*, which latter appears to be peculiar to the Chihuahuan desert region east of the continental divide. The species of the Western desert tract is invariably found on greasewood (*Covillea tridentata*), as is also the case with *B. argentatus*.

When specimens of *B. punctatus* are compared with representatives of *B. argentatus* they show differences as follows:

♂		♀	
<i>B. argentatus.</i>	<i>B. punctatus.</i>	<i>B. argentatus.</i>	<i>B. punctatus.</i>
Fastigium comparatively broad, not strongly acute-angulate, hardly carinate.	Fastigium narrow, sublanceolate, distinctly carinate.	Fastigium broad, subrectangulate to very slightly acute, hardly carinate.	Fastigium somewhat produced, decidedly acute-angulate, distinctly carinate.
Face moderately retreating.	Face very considerably retreating.	Face moderately retreating.	Face very considerably retreating.
Eye not more than half again as long as the infraocular sulcus.	Eye twice as long as the infraocular sulcus.	Eye but little longer than the infraocular sulcus.	Eye more than half as long again as the infraocular sulcus.
Blackish-brown maculations on lateral lobes of pronotum and pleura marked.	Blackish-brown maculations on lateral lobes of pronotum and pleura very weak.	As in the male.	As in the male.
Tegmina with more numerous maculations.	Tegmina with few or no maculations.	As in the male.	As in the male.
Caudal femora with the dark bars usually quite prominent.	Caudal femora with the dark bars weaker or even subobsolete.	As in the male.	As in the male.
Size larger.	Size smaller.	Size larger.	Size smaller.

⁵ *Proc. U. S. Nat. Mus.*, XXXIV, p. 73.

Measurements.

	♂		♀	
	<i>B. argen-</i> <i>tatus.</i>	<i>B. punc-</i> <i>tatus.</i>	<i>B. argen-</i> <i>tatus.</i>	<i>B. punc-</i> <i>tatus.</i>
	El Paso, Tex.	Cotton- wood, Cal.	El Paso, Tex.	Cotton- wood, Cal.
	mm.	mm.	mm.	mm.
Length of body,	20	23	17	22
Length of pronotum,	3.9	4.2	3.2	3.8
Length of tegmen,	18.5	18.5	15.8	15
Length of caudal tegmen,	11.2	12	9.2	10.2

The series before us is from the following localities: Cottonwood, September 9, 12 ♂, 10 ♀, 1 immature specimen; North Range, Providence Mountains, August 12, 1 ♂, 2 ♀, 2 immature specimens; Cima, August 12, 1 ♀; Kelso, August 12, 1 ♀, 1 immature specimen; foothills Bird Spring Mountains, California and Nevada, August 11, 3 ♂.

On re-examining all the available material of the genus we find that specimens from Yuma, Sentinel and Sahuaro Plain near Tucson Mountains, Arizona, recorded by us⁶ as *B. argentatus*, are really *B. punctatus*; but it also appears probable that the two species may intergrade in the vicinity of the divide and the more elevated central tract, as the specimen from Sahuaro Plain and other material from Florence, Arizona, show a tendency toward *B. argentatus* in the form of the fastigium, although distinctly *punctatus* in the sum total of characters. The Yuma specimens are typical *punctatus*, the tegmina being even more immaculate than is the case with the Californian specimens.

It is quite probable that the specimens of this genus previously recorded from Bill Williams Fork, Indio and Palm Springs as *B. argentatus* belong to *B. punctatus*. This species produced practically the same stridulation as *B. argentatus* and in habits was also similar.

***Amphitornus ornatus* McNeill.**

This species is represented by a series of two males and one female from Pasadena, taken August 1; five males and three females from Mt. Lowe, taken at elevations of from 4,000 to 4,800 feet, August 8; and one pair from El Toro, Orange County, taken August 20.

When compared with specimens from Aden, New Mexico, the Californian individuals are inseparable. The pair from El Toro are more reddish than the others, the pattern also being duller and less con-

⁶ *Proc. Acad. Nat. Sci. Phila.*, 1908, p. 376.

trasted, while the Mt. Lowe individuals have the bars and maculations standing out in strong contrast. The femoral bars are limited to the vicinity of the dorso-lateral carina in the El Toro specimens, more extensive ventrad in the Pasadena individuals and covering the greater portion of the lateral face of the femora in the Mt. Lowe representatives.

At Pasadena the species was taken on the lower slopes of the San Rafael Hills, among shrubs and dry grasses. On Mt. Lowe the insect was found to be very shy, of swift but not long flight, and when pursued closely the individuals would hide in the grasses, very effectually concealing themselves. At El Toro the species was found common in high grain growing along irrigating ditches.

The species has previously been recorded from the following localities in California: Los Angeles, Point Loma, Lancaster, Cahon Pass and Gazelle.

Opeia testacea Scudder.

Eight males, two females and two immature individuals from Las Vegas, taken August 10, are referred to this species. Here the species occurred in a growth of desert plants and grasses on the plain surrounding the town.

The broad postocular bar is more or less strongly present on the head and dorsal half of the lateral lobes of the pronotum in the majority of the specimens, those without indications of the bar having the sides of the head and the whole of the pronotal lobes entirely infuscated.

The species has been recorded from the following Californian localities: Lancaster, Kern City, Tulare, Lathrop and Dominguez.

Cordillaeris grinnelli n. sp.

Type: ♀; South Fork of the Santa Ana River, elevation 6,200 feet, San Bernardino Mountains, California, July 6, 1906. Collected by Joseph Grinnell. [Acad. Nat. Sci. Phila.]

Related to *C. occipitalis*, *cinerea* and *affinis*, but differing from all in the shorter tegmina which leave a considerable portion of the abdomen exposed. The coloration is nearer to that of *affinis*, as represented by Idaho specimens, but the longitudinal line on the lateral face of the caudal femora is more continuous than in that species.

Size medium (for the genus); form moderately slender. Head but little expanding ventrad, with the dorsal length about subequal to that of the dorsum of the pronotum, the occiput very slightly arcuate and the fastigium horizontal when seen from the side; fastigium slightly acute-angulate with the apex rotundato-truncate, the

disk of the fastigium with the impressed line of essentially the same form as the margin of the fastigium, the apex of the impressed line being nearer to a line drawn between the cephalic margins of the eyes than to the apex of the fastigium; angle of the fastigium when seen from the side rectangulate, the facial line vertical to between the antennæ where the face becomes considerably retreating; lateral foveolæ elongate-lanceolate, the ventral margin not strongly marked; frontal costa regularly but very slightly expanding caudad, considerably sulcate ventrad of the ocellus, slightly so dorsad; eyes trigonal-ovoid, in length about equal to the infraocular sulcus, when seen from the dorsum not very prominent; antennæ about four-fifths the length of the caudal femora, slightly ensiform proximad. Pronotum with the disk slightly less than one and one-half times as long as the greatest

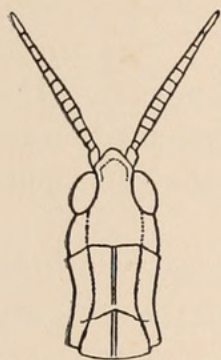


Fig. 8.—*Cordilacris grinnelli* n.sp. Dorsal outline of the head and pronotum of type. ($\times 3$.)

caudal width of the same; cephalic margin subtruncate, caudal margin very slightly arcuato-angulate; median carina not prominent but distinct; lateral carinæ but little constricted mesad, moderately divergent caudad, the width between the same cephalad being two-thirds of that caudad; principal transverse sulcus placed distinctly caudad of the middle. Tegmina less than three times as long as the disk of the pronotum, failing to cover the abdomen by nearly the pronotal length, the tegmina considerably narrowed distad, the apices narrowly rounded. Interspace between the mesosternal lobes decidedly shallow and transverse, the width being equal to that of one of the lobes; interspace between the metasternal lobes small, subquadrate. Caudal

femora reaching to but not surpassing the apex of the abdomen, slender, but more robust than usual in the genus, the greatest width contained about four times in the length, pattern of the paginæ well impressed, internal genicular lobes slightly acute, external obtuse-angulate; caudal tibiæ slightly arcuate proximad, spines numbering from eleven to thirteen.

General color ochraceous-buff, becoming ochraceous on the abdomen, hoary-white on the sides of the head, dark clay color on the dorsum of the head and pronotum and french gray distad on the tegmina. The usual broad postocular bar is mars brown, the longitudinal line on the external face of the caudal tibiæ is vandyke brown and unbroken. The lateral carinæ of the pronotum are ochraceous-buff, marked mesad with very dark brown on the metazona, with the same

laterad all their length. Occiput darker mesad, eyes raw umber; antennæ clay color; face sprinkled with blackish brown. Tegmina with a few scattered quadrate brownish patches, more or less distinct and chiefly proximad. Caudal femora strongly pinkish brown dorsad with slight indications of three transverse bars; caudal tibiæ dull brownish with a faint purplish tinge, the spines with their apical halves blackish.

Measurements.

Length of body,	19.5 mm.
Length of pronotum,	3.6 "
Length of tegmen,	10 "
Length of caudal femur,	11.3 "

In addition to the type we have examined a single paratypic adult and two paratypic immature females. The adult differs from the type only in a slightly greater intensity of coloration.

We take great pleasure in dedicating this interesting species to Dr. Joseph Grinnell, to whose kindly interest we are indebted for this and a number of other Californian Orthoptera.

Cordillacris apache Rehn and Hebard.

This species, previously known only from four localities in southwestern New Mexico, is represented by two males and one female from Cima, taken August 12. These specimens were taken in tumbleweed along the railroad track, individuals being very scarce.

One of the males is slightly more ochraceous than the others, while the female is rather grayish. The specimens are rather smaller than the average when compared with the original series from New Mexico.

Orphulella compta Scudder.

This species is represented in the collections before us by eight males and eight females taken at Las Vegas, Nevada, August 10, and fifteen males and five females from Indio, taken July 29.

All the Indio specimens are in the green phase, although somewhat modified in several, while five-eighths of the Las Vegas series is in the same phase, the remaining specimens being either umber brown and buff in general tones or pinkish ochraceous marked with blackish brown on the sides of the head and pronotum.

At Las Vegas the species was found well distributed in grass beside a stream.

The species is now known from Yuma, Bill Williams Fork and San

Bernardino Ranch, Arizona; Palm Springs and Indio, California, and Las Vegas, Nevada.

***Orphulella affinis* Scudder.**

At Alamitos Bay, July 31, this species was found common among the scant grasses of the beach dunes, while at South Coronado Beach, August 16, it was secured among low salt marsh plants. Nine males, five females and one immature specimen were taken at the former locality and two adults of each sex and four immature individuals at the latter.

A moderate amount of variation in size in both sexes is presented by the Alamitos Bay series. All the specimens are in the brown phase except three males from Alamitos Bay and one immature specimen from South Coronado Beach.

The species is now known from San Diego, South Coronado and Coronado Beach, Alamitos Bay, Kern City and "Colorado Desert," California.

***Napaia gracilis* McNeill.**

This interesting species was found at an elevation of 4,000 to 4,800 feet on Mt. Lowe, August 8, where it lives among grasses, leaping and crawling about actively. The wings are not used for flight, serving the sole purpose of stridulating organs in the male sex. The stridulation is quite like that of *Chorthippus curtipennis*, but much louder.

A series of six males and seven females was taken, and but little variation in size and color is to be noticed. The insect appeared to be extremely local and was found in but one location between two small mountain slopes.

The species is known from Mt. Wilson, 2,400 feet, and Mt. Lowe, 4,000 to 4,800 feet, the San Gabriel Mountains near Claremont, at Claremont and Los Angeles, California.

***Psoloessa texana* Scudder.**

A series of forty-seven Californian specimens of this very variable species have been examined. This series is distributed as follows: Tia Juana, August 16, one male; Coronado Beach, August 15-16, five males, two females; Alamitos Bay, July 31, one female; Miramar, July 31, five males, two females and three immature specimens; Altadena, August 8, nine males, ten females; Pasadena, August 1, three males, one female; Echo Mountain, San Gabriel Range, August 8, 2,700 to 3,500 feet, one male.

Two of the males and three of the females belong to the form *budd-*

iana, while two males and two females belong to the true *texana* type. The remainder of the series represent the numerous intermediate phases between the two extremes, except one male from Pasadena which has the dorsum dull maroon, the lateral lobes almost entirely pale greenish yellow and no broad postocular bar or broken remnants of the same present, the pale lateral carinæ being merely edged with dark laterad.

Specimens from the beach localities, Pasadena and Echo Mountain, are paler in color than the others.

At Tia Juana the species occurred on rocky hillsides, while at Coronado Beach it swarmed on dry grasses. At Alamitos Bay it was taken on dunes, and at Miramar found very active but not common back of the low beach dunes.

***Ageneotettix australis* Bruner.⁷**

On August 12, at Cima, California, this species was quite common in tumbleweed along the railroad track, a series of twenty-six males and seven females being taken. When compared with specimens from southern Arizona, *i.e.*, Huachuca and Tucson Mountains, the Cima series is uniformly smaller, the difference being less appreciable, however, in the male than in the female.

The coloration of the series is rather subdued, although the bars on the dorsal surfaces of the caudal femora and the lateral carinæ of the pronotum are marked in all the specimens. The caudal tibiae vary somewhat in the exact shade of color, but all possess a distinct ochraceous proximal annulus.

There is considerable individual variation in the length of the tegmina and wings, some having them slightly but distinctly exceeding the tips of the caudal femora, others have them distinctly but not greatly shorter than the tips of the femora, the average being very slightly shorter than the femoral tips.

This is the first record of the species from California.

***Ageneotettix sierranus* n. sp.**

Types: ♂ and ♀; Summit House, Madera County, California. Altitude, 3,200 feet. September 3, 1907. Collected by M. Hebard. [Hebard Collection.]

⁷ A single short-winged female of this genus from Cuyamaca, San Diego County, California (October 1, 1900; G. W. Dunn), in the Academy Collection, has been examined and is referred provisionally to *A. occidentalis*, although the status of this form is in the authors' opinion very doubtful. It is quite possible that the long-winged forms are more or less completely dimorphic.

Allied to *A. australis* Bruner, but differing in the glaucous caudal tibiae, the less inflated and more tapering caudal femora, the more sharply defined and more decidedly sulcate frontal costa in both sexes, this being narrower dorsad in the new form, and in the facial outline being truncate between the antennae, this being more decided in the male than in the female.

Size rather small; form moderately slender. Head with the dorsal length equal to (σ) or slightly less than (φ) the dorsum of the pronotum; occiput considerably ascending to the interocular region, slightly arcuate in the male, hardly so in the female, the interocular region elevated considerably dorsad of the dorsum of the pronotum; fastigium distinctly but not greatly arcuate declivent, the fastigio-frontal angle rounded obtuse, fastigium slightly acute-angulate in both sexes when viewed from the dorsum, distinctly but shallowly excavate; lateral foveolae well impressed, elongate, subtrigonal, the apex blunt,

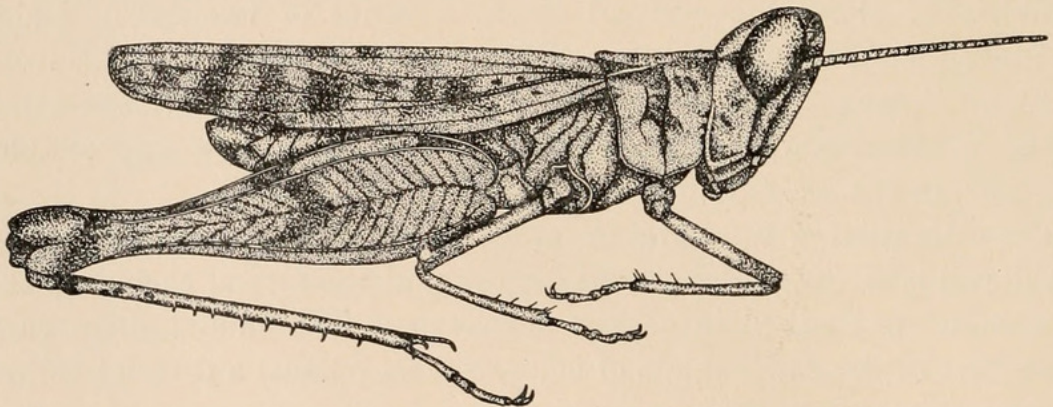


Fig. 9.—*Ageneotettix sierranus* n. sp. Lateral view of male type. ($\times 5$.)

cephalad, the caudal width but little exceeding half the length; facial line considerably retreating ventrad and distinctly subtruncate and vertical from the fastigio-facial angle to a point directly cephalad of the insertion of the antennae; frontal costa with the margins regularly diverging caudad with a hardly appreciable constriction in the vicinity of the ocellus, distinctly sulcate dorsad and mesad and shallowly so ventrad; eyes moderately prominent in the male, hardly so in the female, elliptical reniform in outline, in length about twice (σ) or half again (φ) as long as the infraocular sulcus; antennae equal to (φ) or slightly exceeding (σ) the head and pronotum in length, slightly depressed, the apices acuminate. Pronotum with the greatest dorsal width about four-fifths the length, the dorsal line of the same slightly depressed mesad when seen from the side; cephalic margin angulato-truncate, caudal margin broadly obtuse-angulate, the immediate angle well rounded in the female; median carina distinct

throughout its length, not high; lateral carinae low, the width between them at the cephalic margin nearly twice that at the first transverse sulcus and but little more than half that at the caudal margin; lateral lobes very slightly deeper than wide, ventro-cephalic angle obtuse, ventro-caudal angle well rounded. Tegmina reaching to the middle of the genicular arches of the caudal femora, tips rather narrowly rounded. Prosternum moderately inflated, a distinct, transverse, oblong swelling present; interspace between the mesosternal lobes distinctly transverse, as wide as one of the lobes; metasternal lobes subcontiguous. Caudal femora very slightly shorter than the length of the tegmina, considerably inflated proximad, the pregenicular portion quite slender (for the genus), pattern of the paginae distinct and regular but not very deeply impressed; caudal tibiae with eight spines on the lateral margins, nine on the internal margins.

General color buff, pale on the venter and abdomen, the dorsum tending toward ochraceous and clay color. The usual markings found in species of the genus, *i.e.*, on the dorsum of the caudal femora, on the disk of the metazona and bordering the lateral carinae laterad and the narrow postocular line, are distinctly marked in seal brown, the tegmina with a number of small quadrate patches of the same and with the pleura much touched with the same color. Lateral carinae decidedly contrasted, the ventral portion of the metazona of the lateral lobes usually being pale when contrasted with the remainder of the lobe. Face more or less sprinkled with fine spots of bistre, except a pair of areas ventrad of the eyes which are pale. Eyes broccoli brown, suffused more (ventrad) or less (dorsad) heavily with seal brown. Antennae cream-buff, washed with very dull mauve distad, the extreme tips very pale. Caudal tibiae pale buff or buff yellow, more or less completely washed with very pale and dull mauve and speckled with dark patches proximad, a seal brown genicular annulus present, the spines blackish to their bases. Tarsi buffy, more or less distinctly and strikingly marked with blackish.

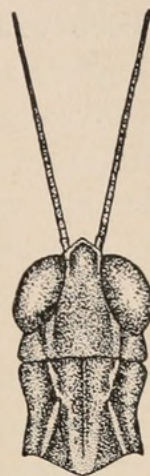


Fig. 10.—*Ageneotettix sierranus* n. sp.
Dorsal view of head and pronotum. ($\times 5$.)

	Measurements.	♂	♀
Length of body,	12	mm.	15.5 mm.
Length of pronotum,	2	"	2.8 "
Length of tegmen,	9.5	"	10.8 "
Length of caudal femur,	8.6	"	10.3 "

Two paratype males and one paratype female, as well as three males from Raymond, Madera County, California, taken September 3, 1907, have been examined by the authors. There appears to be little variation in size and nothing noteworthy in structure, except that the lateral foveolæ are broader in some specimens than in the types and in some more rectangular than elongate-trigonal. In color there is considerable variation, a tendency toward linear streaking of the dorsum of head, pronotum and tegmina being noticed in one Summit House male, while two of the Raymond males are rather rufescent and the remaining one is predominately buffy yellow, with the pattern strikingly contrasted, the occipital bars and maculations of the anal area of the tegmina absent with those parts pure buffy-yellow. In some specimens the caudal tibiæ are inclined more or less strongly toward glaucous.

At Summit House the species was scarce and extremely active, being found in short, dry grass and tarweed under a scattering growth of oak. At Raymond it was taken in stubble and was not common. The contrastingly colored tarsi are very conspicuous in life.

***Ligurotettix coquilletti* McNeill.**

A series of forty-nine specimens from localities in the Mohave and Las Vegas Deserts are referred to this species, to which *L. kunzei* Caudell from southern Arizona is closely related, differing only in the average larger size and slenderer caudal femora. The series is distributed as follows: Cottonwood, September 9, 2 ♂, 1 ♀; Kelso, August 12, 4 ♂, 2 ♀; Cima, August 12, 3 ♂, 3 ♀; North Range, Providence Mountains, August 12, 1 ♀; foothills Bird Spring Mountains, California and Nevada, August 11, 12 ♂, 9 ♀, 1 immature individual; Las Vegas, Nevada, August 10, 9 ♂, 2 ♀.

In size there appears to be considerable geographic variation, Cima individuals being quite small, while the largest female of the Bird Spring Mountains series and of the two of that sex from Kelso are almost as large as individuals of *L. kunzei*. Individual variation is also quite marked in the Bird Spring Mountains series and the two Kelso females are rather different in size, one of the four males from the latter locality also appreciably exceeding the others from that region in size. Average specimens from the various localities measure as follows:

	Length of body.	Length of pronotum.	♂ Length of tegmen.	Length of caudal femur.
	mm.	mm.	mm.	mm.
Cottonwood, Cal.,	14.5	3	14.5	8.7
Kelso, Cal.,	13.8	2.9	14.1	8.3
Kelso, Cal.,	15.5	3.2	16	9.1
Cima, Cal.,	13.3	2.9	12.5	7.3
Cima, Cal.,	14	2.9	13.5	8
Bird Spg. Mts., Cal.-Nev., .	13.3	2.5	12.6	8
Bird Spg. Mts., Cal.-Nev., .	15.3	3	13.9	8.3
Las Vegas, Nev.,	14	2.9	14	8
			♀	
Cottonwood, Cal.,	19	3.5	17.1	9.6
Kelso, Cal.,	21	3.9	18	10.5
Kelso, Cal.,	23.3	3.8	19.2	11.3
Cima, Cal.,	17.7	3.3	15	8.9
Cima, Cal.,	17.5	3.3	16.7	9.1
North Range, Prov. Mts., Cal.,	19.5	3.7	17.8	10
Bird Spg. Mts., Cal.-Nev., .	19.8	4	16.8	10.2
Bird Spg. Mts., Cal.-Nev., .	21.2	4.3	20	11
Las Vegas, Nev.,	18.5	3.8	18.5	9.9

The large Kelso and Bird Spring Mountains females are very similar in size to individuals of the Arizonan *kunzei*, as will be seen by comparing the measurements given above with those of *kunzei* recently published by the authors,⁸ but on comparing the proportions of the caudal femur the relationship of the larger Californian specimens is seen to be with *coquilletti*. It appears quite probable that *kunzei* is merely a geographic race of *coquilletti*.

The color form with blackish brown on the prozona of the lateral lobes of the pronotum, genæ and pleura already described by the authors from Yuma material is strongly represented in the California *coquilletti*, two males and two females from Cima and five males and four females from the Bird Spring Mountains being in this phase. The Las Vegas and Kelso series are uniformly paler and less contrastingly colored, the Las Vegas one very much paler and grayer, than the other lots; the Cottonwood individuals are dusty blackish-gray with the ochraceous tones reduced to a minimum. The dorsal femoral bars are quite strongly marked in the individuals with the blackish-brown markings on the pronotum, while the dorsal aspect is also more buffy in these specimens.

At Cottonwood the species was found common on greasewood (*Covillea tridentata*), and plentiful at Kelso and in the Bird Spring

⁸ *Proc. Acad. Nat. Sci. Phila.*, 1908, p. 384.

Mountains on the same plant. At Cima it was found on small thorny bushes, and at Las Vegas one small colony was located in a low thicket of spiny desert bushes.

The species was originally described from Los Angeles County, California, and has since been recorded from Needles, California, and Yuma, Arizona, by Bruner, and Yuma, Arizona, and Palm Springs and Lancaster, California, by Scudder. Specimens from Yuma examined by the present authors are clearly *kunzei*, and it appears probable that the records from Yuma and possibly from Needles and Palm Springs may be the same. True *coquilletti* appears to be a Mohavan and Nevadan form.

***Arphia ramona* Rehn.**

From the evidence of a series of eighteen specimens of this species before us it is apparent that it enjoys a considerable vertical range and also that it is considerably modified by the same. This series is from the following localities: Pasadena, July 6, 1899 ((Fordyce Grinnell, Jr.), two males; Mt. Lowe, August 8, 4,700 feet, one female, 5,300 to 5,600 feet, one male; Kenworthy, San Jacinto Mountains, 4,500 to 5,000 feet, June 3-8 (Fordyce Grinnell, Jr.), one male, three females; Strawberry Valley, San Jacinto Mountains, 6,000 feet, July 18 (F. Grinnell, Jr.), one male; Santa Ana River, San Bernardino Mountains, 5,500 to 6,200 feet, July 1-14 (Joseph Grinnell), three males, one female; Fish Creek, San Bernardino Mountains, 6,500 to 7,200 feet, June 17 to July 10 (Joseph Grinnell), one male, three females; Mt. Pinos, Kern County, June 6, 1904 (F. Grinnell, Jr.), one female.

When compared with the types from San Diego and a paratype series of two males and three females, the specimens from points under 6,000 feet elevation are seen to be very similar to the types, the tegmina and wings alone being slightly longer in several of the mountain specimens. The individuals from greater elevations than 6,000 feet show a perceptible reduction in size, which is very apparent when the specimens are arranged serially according to altitude. There also appears to be a slight flattening of the median carina of the pronotum in individuals from the higher regions.

The female specimen from Fish Creek, 7,200 feet elevation, measures as follows: Length of body, 31 mm.; pronotum, 6.2; tegmen, 26; caudal femur, 15.3.

There is a considerable amount of individual variation in the general color, this being blackish or brownish, strongly speckled or nearly uniform, the pale stripe on the anal field of the tegmina also being equally variable in its width, presence or absence.

At 5,300 to 5,600 feet on Mt. Lowe the species was found on a steep rock slide and at 4,700 feet it occurred on a steep slope.

This species has been previously recorded from but two localities—San Diego and Los Angeles, California.

Chimarocephala incisa Caudell.

A single specimen of this species, taken at an elevation of 5,500 feet on the Santa Ana River, San Bernardino Mountains, June 14, by Dr. Joseph Grinnell, has been examined. This individual is quite blackish, with the femoral and pronotal maculations strongly contrasted when compared with individuals from San Diego and Claremont, California.

We have followed Caudell⁹ in using this name for the species usually known as *C. pacifica* Thomas.

Encoptolophus californicus Bruner.

A female specimen of this species was taken among sand dunes at Alamitos Bay, July 31, while one male individual was captured along the Mohave River at Cottonwood, September 9. The Cottonwood specimen is smaller than the measurements given by Bruner for the male sex, the length of body being 15 mm., that of the pronotum 3.3, of the tegmen 13 and of the caudal femur 10, although in almost all other respects the specimen is typical. The lateral carinae of the pronotum are somewhat undulate on the prozona in the male, although nearly straight in the female. Both specimens are in a brownish phase similar to the male type.

The only previous record of the species is that of the type—Los Angeles, California.

Encoptolophus robustus n. sp.

Type: ♀; Los Angeles River near Los Angeles, California. August 24, 1907. (Otho Poling.) [Hebard Collection.]

Closely related to *E. texensis* and *subgracilis*, differing in the more robust build, more prominent and elevated pronotal carinae, the lateral ones being less divergent caudad than in *texensis*, in the more excavate fastigium and the more inflated caudal femora.

This species is not at all close to *E. pallidus* Bruner, with cotypes of which it has been compared.

Size medium; form robust though slightly compressed. Head with the dorsum considerably arcuate when seen from the side, though not elevated dorsad of the median pronotal carina, interspace between the eyes rather broad though less than the short diameter of the eye; fastigium as much arcuate declivent as the occiput rises to the interspace between the eyes, subpyriform, slightly longer than wide, rather deeply excavate, a distinct median carina present on the

⁹ *Proc. Ent. Soc. Wash.*, VII, p. 124.

caudal portion and becoming subobsolete on the occiput; angle of the fastigium and face rounded obtuse; lateral foveolæ trigonal, rather large, moderately excavate; frontal costa as a whole rather broad, moderately and regularly expanding from the distinct fastigio-facial division to the ocellus, below which it is slightly constricted then moderately expanded to the clypeal suture, sulcate throughout except close to the clypeal suture; eyes reniform-elliptical, slightly prominent, somewhat exceeding the infraocular sulcus in length; antennæ distinctly less than the head and pronotum in length. Pronotum with the median carina moderately elevated, rather uniform in height, although the section on the metazona is a trifle lower than that on the

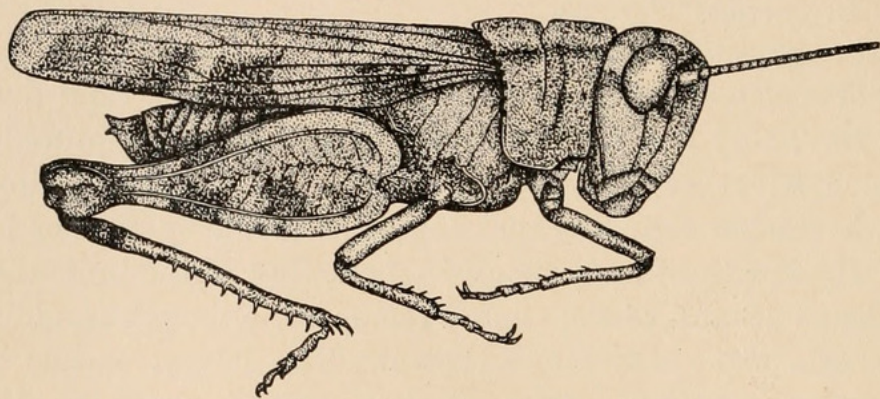


Fig. 11.—*Encoptolophus robustus* n. sp. Lateral view of type. ($\times 3$.)

prozona, the incision being well marked and rather broad; lateral carinae marked, regularly divergent caudad, the space separating them caudad half again as much as that cephalad, the carinae being sinuate for a short distance on the caudal portion of the prozona; cephalic angle of the disk broad obtuse, caudal angle of the disk

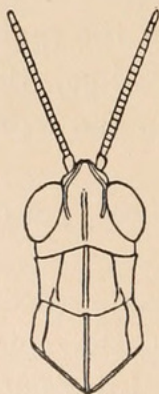


Fig. 12.—*Encoptolophus robustus* n. sp. Dorsal view of head and pronotum. ($\times 3$.)

slightly obtuse with the angle narrowly rounded; lateral lobes deeper than long, slightly narrowing ventrad, the ventral margin considerably sinuate cephalad. Tegmina very slightly surpassing the tips of the caudal femora; intercalary vein with the proximal half nearer to the ulnar vein, the distal half equidistant between the ulnar and median veins. Interspace between the mesosternal lobes strongly transverse; interspace between the metasternal lobes quadrate. Caudal femora considerably inflated, the greatest width being about one-third the length; pattern of the pagina well impressed and regular, the expansion of the ventral carinae slight; caudal tibiae with nine to ten spines on the external margins.

General color wood brown with the tegminal bars and general mottling bistre. Head with the occiput and face thickly mottled and finely dotted; the postocular region with a poorly defined postocular bar present only on the face, this bordered dorsad with a patch of almost clear wood brown; eyes tawny olive clouded ventrad with bistre; antennæ walnut-brown with obscure broad dark annuli; face with two obsolete and poorly defined transverse blackish bars on the frontal costa ventrad of the antennæ. Pronotum almost uniformly mottled with the general colors, a slight blackish patch present in the middle of each lateral lobe. Tegmina with three dark transverse bars, the two distal ones oblique and the third from the base fading distad, the apical portion with numerous very small dots, the bars not reaching the anal field which has a number of small irregular maculations. Wings bluish-hyaline proximad, the apex with the slightest possible infumation, the stigma brownish. Caudal femora with three dark bands, one median, one pre-apical, one genicular, these bands more distinct and blackish on the dorsum, genicular arches and lower portion of the paginæ, which latter the median one crosses obliquely, the pre-apical one being marked on the ventral surface, though all are present on the ventral sulcus and internal face; caudal tibiæ pale glaucous-blue with a wood-brown proximal annulus which is touched with darker brown, spines blackish for the greater portion of the length.

Measurements.

Length of body,	19	mm.
Length of pronotum,	4.5	"
Length of tegmen,	15.8	"
Length of caudal femur,	11.3	"

In addition to the type two specimens of this species, one male and one female, in the U. S. National Museum collection, from Los Angeles (Coquillett), have been examined. These individuals agree with the type in all essential characters, the female, however, being somewhat larger. The measurements of these specimens are as follows:

	♂	♀
Length of body,	16.3 mm.	21.5 mm.
Length of pronotum,	3.6 "	5 "
Length of tegmen,	14.5 "	18 "
Length of caudal femur,	10.8 "	13.5 "

In color the Los Angeles pair are slightly paler, with the tegminal and femoral bars less plainly indicated in the female, while the glau-

ous-blue of the caudal tibiæ is paler than in the type. The wing of the male is distinctly very pale yellowish-hyaline proximad.

Gamnula pellucida (Scudder).

On Santa Catalina Island this species was found to be extremely local, but plentiful in a small area of short grass, where one male and eight females were taken on August 7. At Mill Valley, August 23, the species was found uncommon on dry grassy hillsides, two females being taken, while a single male was captured at Merced, August 30, in very dry, yellow, oat-like grass.

The Santa Catalina Island and Merced individuals are more yellowish in color than the Mill Valley specimens.

Hippiscus pardalinus (Saussure).

Six specimens, two males and four females, from the San Bernardino Mountains, taken by Dr. Joseph Grinnell, belong to this widely distributed species. One male and two females are from Fish Creek, at an elevation of 6,500 feet, June 18-20; the remaining individuals being from the South Fork of the Santa Ana River, at an elevation of 6,200 to 6,700 feet, July 1-24.

The disk of the wing is orange vermillion in all the specimens instead of yellow as usually described, but in general characters and proportions no other differences are noted. Several of the females have a considerable amount of hoary-white suffusion.

The only previous exact Californian records were from San Diego and Rock Spring, southern California.

Hippiscus neglectus (Thomas).

Four males and four females of this species from the South Fork of the Santa Ana River, San Bernardino Mountains, taken at an elevation of 6,200 feet, on July 6 and August 26, by Dr. Joseph Grinnell, and a pair from Mt. Pinos, the female with a supplementary "Potrero" label, taken June, 1904 (♀ June 7), by F. Grinnell, Jr., have been examined. A considerable amount of variation is present in the series, but nothing other than one would expect in this very variable species. The tegminal stripe is very broadly marked in one male specimen.

This is the first record of this species from southern California, the only previous records from the State being from the Sierran region.

Leprus interior Bruner.

A single male of this species from the foothills of the Bird Spring Mountains, McCollough Range, Nevada, August 11, has been examined. It is very similar in character to a series from the Salt Lake Valley,

Utah, and was collected on a bare volcanic mountain side. The specimen is slightly smaller than the original measurements of the male sex given by Bruner. This is the first record of the species from Nevada, and in fact from any locality but the Salt Lake Valley.

***Leprus glaucipennis* Scudder.¹⁰**

A series of eleven males and eight females of this species are included in the collection, taken at the following localities: Tia Juana, August 16, two ♂, one nymph; El Toro, August 20, one ♂, one ♀; Santa Catalina Island, August 3 and 7, six ♂, one ♀; Pasadena, August 1, two ♂, three ♀, one additional ♀ taken June 10, 1898, by F. Grinnell, Jr., and Echo Mountain, San Gabriel Range, elevation 3,100 feet, August 8, two ♀.

At Tia Juana it was found on rocky hillsides, while at El Toro it occurred in rolling grain fields. On Santa Catalina Island it was uncommon in dry places, among rocks and scant grasses in a canyon bed, the sides of the mesa of the San Rafael Hills being frequented at Pasadena where it was very scarce. On Echo Mountain the species was numerous at 3,100 feet elevation.

There is some variation in general size and in the length of the wing in this species, the general coloration also exhibiting a tendency to red-brown suffusions, particularly on the head and pronotum, while the disk of the wing shows less greenish and more bluish in some specimens than in others. The latter is particularly true of one Pasadena female specimen.

This species has been recorded from Point Loma, La Jolla, Los Angeles, Rubio Wash, Altadena, Santa Catalina and Santa Rosa Islands, California, and Hermosillo, Sonora and Durango and San Luis Potosi, Mexico. Two females from San Diego have been examined by the authors.

***Dissosteira spurcata* Saussure.**

A series of fifteen males and nine females was taken in a field of stubble at Raymond, September 3, and a single female was secured in a field of very dry, yellow, oat-like grass at Merced, August 30.

This species exhibits a great amount of variation in size and color, the measurements of the extremes of each sex being as follows:

¹⁰ The specimens from the Huachuca Mountains, Arizona, recorded by the senior author (*Proc. Acad. Nat. Sci. Phila.*, 1907, p. 37) as *L. glaucipennis*, when examined with the present series are seen to be *L. cyaneus*.

	♂	♂	♀	♀
	mm.	mm.	mm.	mm.
Length of body,	27	33	32	39
Length of tegmen,	29	33.5	29	35.5

The measured specimens are all from Raymond.

Three of the Raymond males and two of the females are extremely pale in color, almost uniform straw-yellow in general tone, the pronotal, tegminal and femoral maculations being of the very faintest character. The wings of these pale individuals are either clear yellowish-hyaline without any maculations or with very faint indications of the fuscous cloud of the normal type. This yellowish phase is approached by two of the Raymond females, the remainder, however, of both sexes being of the normal type.

The habits of this species have been described by the authors in a previous paper.¹¹

This species has been reported from the San Joaquin-Sacramento Valley between Merced and Redding.

***Dissosteira venusta* (Stål).**

This species has been examined from a number of localities extending from Miramar and San Diego to Mill Valley, California. The series is distributed as follows: Miramar, July 31, ten ♂, 7 ♀; Pasadena, August 1, five ♂, ten ♀; Rubio Canyon, San Gabriel Mountains, August 8, three ♂; Santa Catalina Island, August 3, four ♂, seven ♀; Raymond, September 3, three ♂; Ahwahnee, September 3, one ♀; Miami, September 3, one ♀; Summit House, September 3, three ♂, one ♀; Sentinel, August 31, one ♂.

Specimens from the vicinity of Pasadena and Miramar are as a rule larger than those from the other localities, resembling in this respect specimens from San Diego. Santa Catalina Island individuals are smaller than representatives from the adjacent mainland, while the specimens in the Mill Valley series are appreciably smaller than the southern Californian mainland material. Specimens from the west slope of the Sierras are very similar in size to Mill Valley individuals. The following measurements may be of interest:

	♂			
	Mill		Summit	Rubio
	Valley.	Raymond.	House.	Canyon.
	mm.	mm.	mm.	mm.
Length of body,	18	20	18	18.6
Length of tegmen,	19.2	20.5	19.5	18.9
Length of caudal femur,	11	12	11.2	10.5

¹¹ *Proc. Acad. Nat. Sci. Phila.*, 1906, p. 378.

	♂			
	Pasa- dena.	Miramar.	Santa Catalina Island.	San Diego.
	mm.	mm.	mm.	mm.
Length of body,	19	22.2	17.5	20
Length of tegmen,	19.5	21.5	17.6	20
Length of caudal femur,	11.5	13	10.5	11.5

	♀			
	Mill Valley.	Summit House.	Ahwahnee.	Miami.
	mm.	mm.	mm.	mm.
Length of body,	24.8	25.5	26	24.5
Length of tegmen,	22	23.5	23.8	25.5
Length of caudal femur,	14	12.8	13.5	14

	♀			
	Pasa- dena.	Miramar.	Santa Catalina Island.	San Diego.
	mm.	mm.	mm.	mm.
Length of body,	27.2	28	24.5	29.8
Length of tegmen,	26.5	28	26	29
Length of caudal femur,	16.2	16.2	14	17.2

There is an appreciable amount of individual variation in each lot, but apparently average specimens have been selected for measuring.

The caudal angle of the disk of the pronotum varies somewhat in the degree of angulation, one extreme being subrectangulate, the other distinctly obtuse, the apex more or less rounded. The median carina of the pronotum is rather variable in elevation and inflation, and in a single female from Ahwahnee, which has the pronotal crest quite low, the prozonal portion is uniform and not arcuate.

The general base color varies from dull blackish-brown to ochraceous-buff, the maculations more or less prominent in all but a few individuals which have them quite weak. The color variations, as far as can be determined, are not correlated geographically, dark and pale individuals being present from localities represented by a series of any size. There is also some variation in the intensity, fenestration and shape of the fuscous band of the wing and also a little in the width of the same.

This species is usually common where found and is very active and elusive, flying short distances and alighting precipitately. It occurred on dry grass hillsides at Mill Valley and in tarweed, stubble and meadow land on the west slope of the Sierras. At Miramar it was

found back from the shore, along the border of a field of dry grass near high weeds, while in Santa Catalina Island it frequented dry places among rocks and grasses.

The range of this species in California is entirely west of the Sierras and Sierra Madre and San Jacinto ranges, as far as known not occurring in the true desert regions. Coquillett has recorded it from the San Joaquin-Sacramento Valley from Redding to Merced and from Los Angeles, while Baker has credited it to Claremont and Rehn to San Diego. Stål described it from San Francisco. We have followed Bruner¹² in placing this species in the genus *Dissosteira*, to which it appears to be more closely related than to *Spharagemon*.

***Lactista gibbosus* Saussure.**

This species is represented by a considerable series distributed as follows: Tia Juana, August 16, one ♀; Los Angeles River, Los Angeles, August 24, two ♂, three ♀; Pasadena, August 1, twelve ♂, seventeen ♀; near Rubio Canyon, August 8, four ♂, two ♀; Echo Mountain, 2,700 to 3,500 feet, August 8, two ♂.

There is considerable individual variation in size, this, however, being more noticeable in the male than in the female, while in color the only noticeable variation is a tendency toward a blackish coloration in some individuals and washing with ochraceous in others.

At Pasadena the species was found to be common on the slopes of the San Rafael Hills, while it was equally numerous on Echo Mountain. At Tia Juana it occurred on a rocky hillside overgrown with bushes which were dry and parched.

The species has been recorded from Los Angeles, San Diego and Claremont, southern California.

***Mestobregma rubripenne* (Bruner).**

A single male and three females of this species were taken at Cima, August 12, in low bushes near the railroad, and a single female was secured in the foothills of the Bird Spring Mountains, California, August 11, in sand. At Cima the species was extremely local.

The Californian specimens are all very slightly smaller than representatives from the Huachuca Mountains, Arizona, and also appreciably paler, but no other characters of importance show differences worthy of mention. The pattern, form of the caudal femora, height of the median carina of the pronotum and width of the wing-bar are the same as in the Arizona material. The disk of the wing is yellow or yellowish in all but one specimen.

¹² *Biol. Cent. Amer., Orth.*, II, p. 163.

The previous records of the species are all from southeastern and southern Arizona.

***Trepidulus rosaceus* (Scudder).**

At Las Vegas, Nevada, August 10, this species was found numerous in bare desert places, both the typical phase with the wing roseate proximad and one with the same portion hyaline with an extremely faint whitish suffusion being taken. The series numbers twenty-five males and seven females, each phase represented by sixteen individuals. Fourteen males and two females have the wings roseate and eleven males and five females have the same members hyaline.

There is little variation in size, although the tegmina and wings vary somewhat in length. The degree of production of the ventro-caudal angle of the lateral lobes of the pronotum varies considerably and in a number of specimens the angle is well rounded. The character of this angle cannot be correlated with the color of the wings. The general color is more ashy in some individuals than in others, sometimes touched with dull reddish and again with the maculations more decided than in others. The Nevada specimens as a rule are paler than representatives from southeastern Arizona, but they are well matched in individuals from the lower Arizona deserts at Yuma and Florence.

***Derotmema delicatulum* Scudder.**

The published records and the material at hand indicate that this species is well distributed over the lower portions of the Mohave desert and a considerable area of the Gila desert. A series of fifty-four Californian and Nevadan specimens is now before us, the following localities being represented: Cottonwood, September 9, two males, two females; Goffs, San Bernardino County, California, September 10, one female; Kelso, August 12, five males, seven females; North Range of Providence Mountains, August 12, six males, four females; foothills Bird Spring Mountains, California, August 11, two males, six females; foothills Bird Spring Mountains, Nevada, August 11, ten males, eight females; Arden, Lincoln County, Nevada, August 9, one female. When compared with two pairs from Sentinel, Maricopa County, Arizona, the eyes of all the Californian and Nevadan individuals are seen to be slightly less prominent than in the Sentinel specimens, but in all the essential characters they fully agree. The geographic and individual differences in size are very slight, but the caudal margin of the disk of the pronotum varies from broadly obtuse-angulate to subarcuate. The Kelso and Goffs individuals are paler than the others, in this respect resembling the Sentinel specimens,

although the latter have the pattern more decided than the former. The Bird Spring Mountains series has as a rule a pale ferruginous appearance, although a few are somewhat ashy, while the North Range and Goffs specimens are decidedly ashy, the former, however, with the pattern well contrasted, in the males as strongly as in the Sentinel individuals. The Kelso series is whitish or pale buffy yellow in general tone, while the Cottonwood specimens more nearly resemble the Bird Spring Mountains series than any of the others. The Arden specimen is much like Kelso individuals, but the head and portions of the pronotum and cephalic and median limbs are suffused with dull vermilion.

As far as examined the bar on the wing appears to be uniform in size, while the disk is very slightly more yellowish than in the Sentinel specimens.

At Kelso, in the Bird Spring Mountains, and in the North Range of the Providence Mountains the species was found on the ground and also on small desert weeds, frequently in arroyos.

The previous Californian records of the species are from Mohave and Lancaster.

***Derotmema laticinctum* Scudder,**

It was with considerable surprise that this species was recognized in the series of Orthoptera taken at Cima, California, on August 12. This locality is represented by a series of sixteen males and four females which fully agrees with eastern Arizona and New Mexico material. At Cima the species was plentiful.

This is the first record of the species from California.

***Derotmema saussureanum* Scudder.**

This southern Californian species is represented by a series of thirty specimens taken as follows: Pasadena, August 1, eleven males, thirteen females; near Rubio Canyon, altitude 1,400 to 1,600 feet, August 8, two females; Los Angeles River, Los Angeles, August 24, one male; Beaumont, Riverside County, July 30, one male; Devore, San Bernardino County, September 9, one male; summit Cahon Pass, September 9, one female.

There is considerable variation in the base color in the series, the Pasadena representation exhibiting numerous modifications, ashy, buffy, dull reddish-brown and sometimes overcast with a hoary suffusion.

At Pasadena the insect was found common on dry spots in and near the Arroyo Seco.

The species has previously been recorded from San Bernardino, Colton, Claremont, Los Angeles, Rubio Wash, Anaheim, San Diego, Coronado and Cahon Pass.

Conozoa behrensi Saussure.

A series of fifty-nine specimens is now before us, distributed as follows: Altadena, August 25 (Poling), nine males, sixteen females; Pasadena, August 1, fifteen males, five females; Alamitos Bay, July 31, five males, five females; Tia Juana, August 16, one male, two females; Cottonwood, September 9, one male; Tracy, Alameda County, August 30, one female. There is considerable individual variation in size in both sexes, the extremes of the series of females from Alamitos Bay, for example, measuring as follows:

Length of body,	26	mm.	30	mm.
Length of pronotum,	5.1	"	7	"
Length of tegmen,	25.2	"	30	"
Length of caudal femur,	14.8	"	17.8	"

In color numerous shades of umber, gray-brown, dull ferruginous and occasionally pale ochre occur as the principal value, the maculations being very pale in some individuals and strongly marked in others. The coloration of this insect appears to be profoundly modified by its environment, an individual from the sandy Arroyo Seco at Pasadena being in the pale ochre phase. The tegminal maculations are as a rule quite distinct, though varying considerably in length, the width, however, showing but little variation, while the positions of the bars appear to be fixed.

The fuscous band of the wing varies considerably in width and intensity, while the depth of the yellow color of the disk is distinctly variable. The caudal tibiae are purplish pink in some specimens and vermilion in others, the latter in by far the greater majority of the specimens. The very pale Arroyo Seco specimen has the caudal tibiae rather dark flesh color, yellowish toward the base, no blackish genicular patch present. The latter is strongly marked in the majority of the specimens.

At Tia Juana the species was found in a dry river bottom, some of the Pasadena individuals being from a similar situation, while at Alamitos Bay it frequented scant vegetation on the beach dunes. Its occurrence at Cottonwood in typical Mohavan surroundings is rather surprising as the species is only known elsewhere from the San Joaquin Valley and the slopes and valleys facing the Pacific.

This species has been definitely recorded from San Diego, Claremont and Guadelupe, California.

***Conozoa sulcifrons* (Scudder).**

At Las Vegas, Nevada, a series of ten males and ten females of this species was taken on August 10, while a single male was collected at Indio on July 29.

When compared with a considerable series from Yuma, Arizona, no differences are noticeable.

The previous Californian records of the species were from near the Mohave River (type locality) and Indio. No Nevada records have previously been published.

***Trimerotropis cristata* McNeill.**

Two males and two females of this very pale colored species were taken, August 10, at Las Vegas, Nevada, in typical desert surroundings.

The specimens are quite uniform in coloration and size.

The previous records of the species are from San Julio, Lower California, and Salt Lake Valley, Utah.

***Trimerotropis albolineata* (Bruner).**

Three females of this species were taken in the Arroyo Seco at Pasadena, August 1, while a single male was secured at Beaumont, Riverside County, California, on July 30. Two females taken at Pasadena, June 21 and July 1, by Fordyce Grinnell, Jr., have also been examined.

Some individuals are much more ferruginous than others, and the pattern of the lateral lobes of the pronotum is fainter in one of the Pasadena specimens than in the other individuals examined.

This species is now known from Los Angeles, Pasadena, Ontario, San Bernardino County, Beaumont, Riverside County, and San Diego, California, and southern Arizona.

***Trimerotropis cæruleipes* Scudder.**

An interesting series of seventy-eight specimens of this species is now before us, all but ten of which were taken by the authors. The localities represented are as follows: Mt. Tamalpais, 2,100 to 2,500 feet elevation, August 23, five males and one female; Sentinel, Yosemite National Park, August 31, two males; Yosemite Valley, 4,000 to 5,400 feet, September 1, six males, six females; Grouse Creek, Yosemite National Park, September 1, two males, one female; Eight-Mile Camp, Yosemite National Park, September 1, four males, three females; Mariposa Grove, September 2, four males, four females; Miami, September 3, three males, three females; Mt. Lowe, 5,200 feet to

summit, August 8, two males, three females; Echo Mountain, August 8, four males; Mt. Wilson, 5,000 feet, September 15, one male; Pasadena, August 1, one male, June 23, one male and three females, collected by F. Grinnell, Jr.; Santa Catalina Island, August 3 and 7, three males, one female; Strawberry Valley, 5,000 feet, San Jacinto Mountains, July 7-9, F. Grinnell, Jr., one male, two females. A single male from Ormsby County, Nevada (Baker), and another of the same sex from Cuyamaca Mountains, San Diego County, California, October 1, 1900 (G. W. Dunn), have also been examined.

In a recent paper¹³ Mr. Caudell has shown that *Trimerotropis tessellata* is not a valid species, and the material before us contains not only additional evidence on this point, but also enough to relegate *T. caliginosa* to the synonymy as well, while even the recognition of the two "forms" as varieties appears undesirable, the intermediates being so numerous and graduated.

Almost one-half of the specimens in hand are spread, so the character of the fuscous band of the wing, the opacity of the disk and the amount of infuscation of the apex can be readily observed in a number of individuals.

The dark form, called *caliginosa* by McNeill, with blackish coloration, the disk of the wing transparent faintly colored with greenish, and the faintly fuliginous apex with the extreme tip slightly infuscated, is represented by individuals from Mt. Tamalpais, Miami, Mariposa Grove, Mt. Lowe, Mt. Wilson and Pasadena. One female from Miami, another from Grouse Creek and a male from Yosemite Valley have the metazona of the pronotum ferruginous, strongly contrasted with the blackish general coloration.

The remaining specimens present a great complex of color tones, the dark shades being umber and vandyke brown, while the light bars are hoary, buffy and pale ferruginous. The wing band varies from very weak to well marked, while the apex is hyaline or more or less strongly fuliginous, sometimes with the greater portion of its surface infuscate. When the wing band is well defined the apex is usually hyaline, but this is not invariable. The shade of yellow of the disk of the wing varies considerably, a few specimens, aside from the *caliginosa* type individuals, having it very weak.

This species was found particularly common throughout the conifer forests of the Yosemite region, in company with the slightly less plentiful and less widely distributed *Trimerotropis fallox*. Both of these

¹³ *Proc. U. S. Nat. Mus.*, XXXIV, p. 75.

species were found in numbers on the bare needle-strewn ground under the conifers, especially in sunny spots. It was easier to capture *T. cæruleipes*, but owing to their numbers series of both species were taken without difficulty. The previous Californian records of the species are from Sissons, Marble Valley, El Dorado County, Los Angeles and Cuyamaca.

***Trimerotropis bifasciata* Bruner.**

A pair of this species were taken in dry brush and grass between Rubio Canyon and Altadena, at an elevation of about 1,500 feet, August 8.

This species was scarce, but two specimens only being seen. The previous records are from Los Angeles and Tehama County, California, and Spokane, Washington.

***Trimerotropis koebelei* (Bruner).**

This species was found to be common at Sentinel, Yosemite National Park, August 31 and September 1, a series of eighteen males and three females being taken, as well as a single female at another point in the Yosemite Valley on the last mentioned date.

Wherever collecting was done about Sentinel this species was found and taken without difficulty.

The series exhibits a moderate amount of variation in size, and the lateral lobes of the pronotum have the ventro-caudal margin either with a distinct obtuse angulation or well rounded, the great majority having this region very slightly angulate. The coloration varies somewhat in depth and slightly so in pattern, although the last is chiefly due to intensification or weakening. In but one specimen has the anal area of the tegmina any marked maculations, and then but a number of scattered spots. The black bands between the eyes, one above the antennæ, the other below the same, are often almost as distinct as in *T. cincta*. The dorsal one, however, is frequently absent, but the ventral one is present more or less distinctly in all but one male specimen, which latter with one of the females is remarkable in having the pronotum and head ochraceous-yellow. The broad white bars on the sides of the face are distinct in all but the two individuals mentioned above, although weak in a very dull colored female. The black markings on the lateral lobes of the pronotum are present in practically all the specimens, while the tegminal bars are distinct in all the specimens, although rather weak in several, the width of the bars varying considerably. The three femoral bars—median, preapical and apical—are marked in the majority of

the specimens. The wing band is uniform in the spread specimens, but not strongly indicated or greatly contrasted.

The previous records of the species are from Placer County, Duns-muir, Siskiyou County, and San Francisco, California.

***Trimerotropis thalassica* Bruner.**

This interesting and peculiar species, concerning which practically nothing has been published, is represented by a series of forty-nine specimens from several different regions. Two males were taken, August 23, on Mt. Tamalpais, one at 1,500, the other at 2,100 feet elevation. On Mt. Lowe, August 8 and 24 and September 1, this species was taken at elevations ranging from 4,300 to 5,600 feet, a series of twenty males and twelve females being secured. Two males were taken August 8, in Rubio Canyon, between 2,200 and 3,000 feet, while three of each sex were secured on Santa Catalina Island, August 3. Two males and a female taken at 5,000 feet on Mt. Wilson, September 15, 1908, and four females from Arroyo Seco Canyon, San Gabriel Range, 3,000 feet elevation, October 8, taken by Fordyce Grinnell, Jr., have also been examined.

The favorite habitat of this species was found to be practically the same as that of *Morsea californica*. The insect was found plentiful, especially on Mt. Lowe among the manzanita bushes on the higher slopes. Owing to their lack of wariness and usual short flight specimens were easily taken. They were noted to alight almost invariably upon the manzanita bushes.

The Mt. Tamalpais specimens are quite small when compared with the Mt. Lowe individuals; the Mt. Wilson, Arroyo Seco Canyon and Rubio Canyon representatives also being appreciably smaller than the Mt. Lowe series, but the difference is not as great as in the Mt. Tamalpais specimens. The Santa Catalina Island specimens are also smaller than the average Mt. Lowe individual. Average individuals from the localities represented measure as follows:

	Length of body. mm.	♂ Length of tegmen. mm.	Length of caudal femur. mm.
Mt. Tamalpais,	16.5	17.5	9
Mt. Lowe (summit),	20.8	22	11.3
“ (4,000 to 4,800 feet),	20.6	22.5	11.8
Mt. Wilson (5,000 feet),	21.8	22	11.2
Arroyo Seco Canyon (3,000 feet),	21	22	11
Rubio Canyon (2,200 to 3,000 feet),	19.5	21	10.8
Santa Catalina Island,	17.2	18	10

	mm.	♀ mm.	mm.
Mt. Tamalpais, . . . . .	.....	.....	.....
Mt. Lowe (summit),	27.5	28	14
“ (4,000 to 4,800 feet),	28	28.2	15.5
Mt. Wilson (5,000 feet),	27	27.5	14.8
Arroyo Seco Canyon (3,000 feet), . . . . .	.....	.....	.....
Rubio Canyon (2,200 to 3,000 feet), . . . . .	.....	.....	.....
Santa Catalina Island,	26	26	14.5

The Mt. Lowe series also exhibits considerable individual variation in size in the specimens taken on the summit, the extremes of the males measuring as follows: Length of body, 17–22 mm.; length of tegmen, 20–25 mm.; length of caudal femur, 10.3–13 mm. In none of the other lots of specimens does individual variation play such a decided part, although the Arroyo Seco Canyon and Santa Catalina representatives show it in a lesser degree.

The basic color pattern has already been described by Bruner, but the tegminal bars show almost endless variations in width, intensity and solidarity, while the base color varies from pale ochraceous-buff shades to dull blue-gray, frequently pale pinkish-red. The fuscous band of the wing is also of variable intensity, being distinct and continuous, although not sharply defined, or nearly lacking, indicated only by a cloud at the stigma and another one just beyond the middle of the wing. The Santa Catalina series has the tegminal bars broader and more contrasted than in any of the other specimens.

The principal features of the species which strike one at first glance are the deep head, the usually pale and often black-dotted caudal margin of the pronotal disk, the peculiar granular character of the coloration and the coloration of the caudal femora.

The only previous record of this species is the original of Bruner, who described it from Los Angeles, California. Los Angeles County was probably intended.

***Trimerotropis latifasciata* Scudder,**

A single female of this species was taken at Las Vegas, August 10. While somewhat larger than Scudder's measurements, this individual agrees very well with his description.

This species has been recorded from Wallula, Washington, Salt Lake Valley and Lake Point, Utah, and from Nebraska, although specimens from the last mentioned State may be *T. laticincta* Saussure, if the two forms are considered separable.

Trimerotropis californica Bruner.

This interesting species is represented by a series of twenty-eight specimens from the following localities: Pasadena, July 14, 1898, F. Grinnell, Jr., two males; Pasadena, August 1, 1907, nine males, seven females; Los Angeles River, August 24, one male, one female; near Rubio Canyon, San Gabriel Mountains, 1,000 to 1,600 feet, August 8, four males, two females; Altadena, August 8, one male; summit Cahon Pass, September 9, one male. There is a moderate amount of variation in size and also a great deal in coloration, although the latter is chiefly in the depth of the pattern. Some individuals have the tegminal bars poorly contrasted, but in all they are fairly well defined, though made up of annuli in some individuals. There is some individual variation in the width of the tegminal bars and in the number and position of the quadrate annuli in the apical portion. One of the Pasadena females is entirely suffused with ferruginous, others are partially so, while some are quite dull and others hoary-white. The Cahon Pass specimen is a typical individual, in a grayish type of coloration seen in a pair from Claremont. The wing-band varies to an appreciable extent in width and also somewhat in position.

The species was nowhere really plentiful and was found to be local in distribution, restricted usually to dry places, particularly in the Arroyo Seco at Pasadena. Although moderately vigorous it was more difficult to find than to capture.

This species has been recorded from San Luis Valley, Claremont, Los Angeles and Ontario, California.

Trimerotropis strenua McNeill.

This Great Basin and interior desert form is represented by four males from the Mohave desert and the region to the north, two taken at Cima, August 12, on a plateau of tree yucca, one at Cottonwood, September 9, and the other in the foothills of the Bird Spring Mountains, Lincoln County, Nevada, August 11.

The Cima specimens are inseparable from Salt Lake City individuals, but a tendency toward *californica* is noted in the Cottonwood specimen. The latter has the wing-band narrower than in typical individuals, but the general facies is more distinctly that of *strenua* than that of *californica*, although the former is probably nothing more than a geographic race of the latter.

In action the species was more vigorous than *T. californica* and is apparently a very much scarcer form. The specimens captured at Cima were taken on the tree yucca plateau among brush.

This species is now known from Salt Lake City and Valley and Beaver Creek Hills, Utah, Tucson and San Bernardino Ranch, Arizona, and Cima and Cottonwood, California.

***Trimerotropis inconspicua* Bruner.**

Among the tree yuccas at Cima seven males and two females of this species were taken on August 12. At first glance two species appear to be represented in the series, one typically having the tegminal bars more sharply defined and usually broad, the wing-band rather broad and hardly interrupted and the ventral sulcus of the caudal femora blackish with two yellowish interruptions; the other type having the general coloration paler and more uniformly buffy and hoary-white, the tegminal bars narrower and frequently divided into the component annuli, the wing-band narrow, reduced in length and broadly interrupted, and the ventral sulcus of the caudal femora yellowish white with a single blackish interruption. When compared with all the specimens in the series these apparently separate types are found to have absolutely no structural characters to separate them, and one specimen having the tegminal bars as in the first has the wing-band nearer to that of the second described, while several other specimens apparently belonging to the second type have a decided blackish cloud at the base of the femoral sulcus.

This species has previously been recorded from the Grand River region of western Colorado and Bright Angel, Grand Canyon, Arizona.

***Trimerotropis vinculata* Scudder.**

This widely distributed species is represented by a considerable series of specimens distributed as follows: Mill Valley, August 23, one male; Merced, August 30, one female; Tracy, Alameda County, August 30, one female; Echo Mountain, August 8, two males; Rubio Canyon, August 8, four males; Altadena, August 25, one female; Pasadena, July 18, one male and two females, F. Grinnell, Jr.; Pasadena, August 1, four males, seven females; Alamitos Bay, August 31, one female; Miramar, August 31, eight males, five females; Santa Catalina Island, August 3, twenty-five males, six females; South Fork, Santa Ana River, 6,200 feet, San Bernardino Mountains, July 2, J. Grinnell, one male; Fish Creek, 8,500 feet, San Bernardino Mountains, June 27, J. Grinnell, one male; Indio, August 29, four males; Cottonwood, September 9, one male; Cima, August 12, two males, four females; North Range, Providence Mountains, August 12, one male, one female; foothills Bird Spring Mountains, Nevada, August 11, one female; Arden, Lincoln County, Nevada, August 9, one male; Las Vegas, Nevada, August 10, four males.

This series includes individuals representing a number of color variations, both in pattern and tone, and also exhibiting great diversity in size. The measurements of certain specimens are here given:

	♂	
	Length of body.	Length of tegmen.
Santa Catalina Island,	21 mm.	22 mm.
Miramar,	21 "	23.3 "
Pasadena,	24.2 "	26.7 "
	♀	
Santa Catalina Island,	28.5 "	29.5 "
Miramar,	30.5 "	32.5 "
Pasadena,	30 "	35 "

The Santa Catalina series is as a whole distinctly smaller than any of the other comparable lots, considerable individual variation being noted, the measured specimens, however, being average ones. The specimens from the coast of the adjacent mainland, *i.e.*, Miramar and Alamitos Bay, are but little larger than the Catalina individuals, although there is also a considerable amount of individual difference, while the majority of the Pasadena representatives are considerably larger than any others in the series before us.

As a rule the Catalina, Miramar and Pasadena individuals are duller than specimens from the San Bernardino Mountains, Cima, Indio, Providence and Bird Spring Mountains and Las Vegas. The single Arden specimen has the cephalic portion of the body and limbs well sprinkled and partially washed with pinkish-red.

Trimerotropis vinculata form *similis* Scudder.

This form has rightly been reduced in rank to a variation of *vinculata* by Caudell,¹⁴ and from material before us it appears to have an extensive range.

Two males were taken on Santa Catalina Island, August 3, and a single female at Miramar, July 31. Specimens have also been examined from San Diego and Claremont, California, Albuquerque, New Mexico (Oslar), and El Paso, Texas (Vioreck and Rehn).

Trimerotropis fallax Saussure.

We have before us a series of thirty-two individuals of this peculiar species. The following localities are represented: Yosemite Valley, 4,000 to 5,400 feet, September 1, four males, four females; Sentinel, Yosemite National Park, September 1, one male; Eight-Mile Camp, Yosemite National Park, September 1, three females; Grouse Creek,

¹⁴ *Proc. U. S. Nat. Mus.*, XXXIV, p. 76.

Yosemite National Park, September 1, five males, four females; Mariposa Grove, September 2, two males, two females; Miami, September 3, one female; Ahwahnee, September 3, one male; South Fork, Santa Ana River, San Bernardino Mountains, 6,200 to 6,700 feet, June 28–July 24, 1906, J. Grinnell, three males, two females.

We have mentioned the habitat and abundance of this species in the notes on *Trimerotropis cæruleipes*. In actions this insect much resembled species of *Circotettix* and appears to be very close to that genus. It makes a distinct clatter when in flight.

Yosemite Valley specimens are uniformly more reddish than individuals from the other localities, although closely approached in some Mariposa Grove specimens. A number of individuals have the pronotum reddish or dull ochraceous. The coloration of the tegmina is rather uniform considering the size of the series, the annular dark fuscous spots being regularly distributed, a tendency to form transverse bars being noted in but two specimens, these from the San Bernardino Mountains. There is some variation in the depth of the yellow on the disk of the wing, but the majority of the specimens are quite uniform in this respect, sulphur yellow being the color found in the greater number. The fuscous wing-band frequently has numerous pale cellular spots distributed over it, the veins being darker than the cells, but a number of individuals have the band nearly solid, and in all it is well defined and decidedly indicated. The apical portion of the wing is nearly uniform infumate in the series from the Yosemite and adjacent regions, while it is much paler and semi-hyaline in several San Bernardino Mountains specimens, although one individual from the latter region is similar to the Yosemite majority. In some specimens the pale cellular areas are also indicated in the apical region. This species has been recorded from "California" and Placer County, California.

***Trimerotropis cæruleipennis* Bruner.**

This interesting species was common on Santa Catalina Island, where a series of forty-seven males and thirty-two females was taken on August 3 and 7. Generally speaking it frequented the steeper slopes of the island. These insects were not as active as some individuals of the species taken a few years ago at Salt Lake City. Two males were also taken in the greasewood section at Cottonwood, September 9, where they were the only individuals of the species seen.

When compared with two females from Salt Lake City, the Santa Catalina Island specimens are seen to be decidedly smaller, while the Cottonwood individuals are, allowing for the difference in sex, nearer

the Salt Lake representatives in size. Average individuals measure as follows:

	Length of body.	Length of pronotum.	♂ Length of tegmen.	Length of caudal femur.
	mm.	mm.	mm.	mm.
Santa Catalina Island, Cal.,	17.8	4.1	19.5	10.5
Cottonwood, Cal., . . .	24	5	25.5	13
Cottonwood, Cal., . . .	21	4.5	23	12
			♀	
Santa Catalina Island, Cal.,	21.7	5	23.5	12.2
Salt Lake City, Utah, . . .	28.5	5.5	30.2	14.8

The Cottonwood individuals are similar to the Salt Lake specimens in general coloration, while the Santa Catalina series has, as a rule, the tegminal markings duller, less contrasted and less sharply defined, the whole coloration being somewhat more grizzled and less generally contrasted, particularly in the female, than is the case with Great Basin and Mohave Desert specimens. The color of the disk of the wing varies considerably in depth, in fact from very pale greenish blue to rather deep cerulean blue, while the fuscous band and spur is represented in some specimens by mere infuscations of the veins and in others by a well-defined and rather deep cloud which falls but little short of the caudal margin. The caudal tibiae exhibit a considerable amount of variation in the depth of the coloration.

This species has been recorded from localities extending from Washington to Montana and Wyoming south to southern California and Arizona. The previous Californian records are from Los Angeles, Claremont, Santa Catalina Island and Sisson.

Trimerotropis cyaneipennis Bruner.

Two males and one female of this species were taken on volcanic foothills of bare black rock with hardly any vegetation near the North Range of the Providence Mountains, August 12.

These individuals measure as follows:

	Length of body.	Length of pronotum.	Length of tegmen.	Length of caudal femur.
♂ . . .	19 mm.	3.9 mm.	20 mm.	10.6 mm.
♂ . . .	21 "	3.9 "	21 "	11 "
♀ . . .	24.5 "	4.7 "	25.5 "	12.5 "

In general coloration the Providence Mountains specimens resemble individuals from Salt Lake City, although considerably smaller.

The wing-band is narrow in all the Californian specimens, while the apex of the wing is hyaline. The color of the disk is similar to that seen in specimens from the Huachuca Mountains, Arizona.

The previous records of the species cover localities extending from northern Utah to southern New Mexico and Arizona, this being the first record of the species from California. The elevation at which the Providence Mountains specimens were taken, 2,000 to 2,300 feet, appears to be lower than any from which the species has previously been recorded. The species was found to be scarce.

***Trimerotropis pseudofasciata* Scudder.**

A pair of specimens from Coronado Beach, where they were taken in beach vegetation among sand dunes, August 15 and 16, are referred to this species. These specimens have a distinct but rather weak wing-band which reaches the caudal margin, but is hardly continued at all toward the anal angle. This band is narrowly severed immediately caudad of the spur, the latter extending nearly half the distance to the base, while the apex is hyaline except for the infuscation of some of the veins.

The measurements of the Coronado Beach specimens are as follows:

	Length of body.	Length of pronotum.	Length of tegmen.	Length of caudal femur.
♂ . . .	19 mm.	4 mm.	19.5 mm.	11 mm.
♀ . . .	25 "	6 "	29.5 "	15 "

The species has been recorded from localities extending from Washington to southern California, east to Colorado. The specimens taken were quite feeble, probably due to recent emergence.

***Circotettix shastanus* Bruner.**

Three males of this species were taken on bare, almost precipitous walls of rock at 4,800 feet elevation in the Yosemite Valley, September 1. In such locations specimens were plentiful, keeping up a constant loud clattering. Owing to their vigorous flight and the character of the environment they were very difficult to capture. The specimens are quite uniform in coloration, though exhibiting some little individual variation in size, agreeing fully in all respects with Bruner's and Scudder's descriptions of the species.

Originally described from Hazel Creek, Shasta County, California, the species has since been recorded by Scudder from Siskiyou, Oregon, and Yosemite Valley.

***Circotettix splendidus* n. sp.**

Types: ♂ and ♀; Mt. Lowe, 5,300 to 5,600 feet, San Gabriel

Mountains, Los Angeles, California, August 8 (♂) and September 1 (♀), 1907. Hebard (♂) and Poling (♀), collectors. [Hebard Collection.]

Related to *C. shastanus* Bruner and *rabula* Rehn and Hebard, differing from the former in the broader tegmina, the free upper branch of the first subjacent radial vein and in the more deeply sulcate frontal costa, while from the latter it differs in the narrower interspace between the eyes, in the more distinct wing-band and decided general color pattern and in the glaucous caudal tibiae.

Size large; form moderately robust; surface finely rugulose. Head with the occiput distinctly arcuate, interocular space distinctly narrower than the shortest diameter of the eye in both sexes, not quite as high as the summits of the eyes; fastigium considerably declivent, slightly longer (♂) or no longer (♀) than broad, divided longitudinally into two parts by a marked medio-longitudinal carina which extends caudad becoming obsolete on the occiput, each side of the fastigium independently concave in section, lateral margins moderately elevated; lateral foveolae trigonal, elongate (♂) or subequilateral (♂), moderately impressed; frontal costa of moderate width,

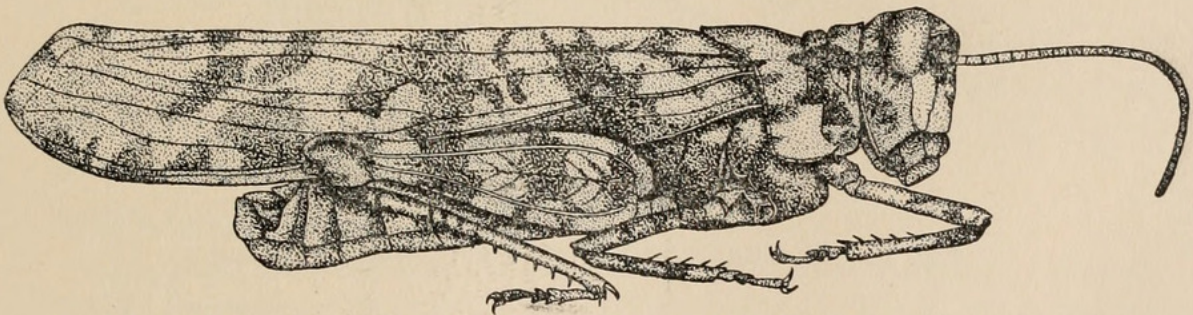


Fig. 13.—*Circotettix splendidus* n. sp. Lateral view of male type. ($\times 2\frac{1}{2}$.)

slightly (♂) or considerably (♀) narrowed dorsad and ventrad of the ocellus, the margins very slightly or considerably divergent ventrad, around the ocellus and ventrad of the same the surface is deeply and rather broadly sulcate; accessory facial carinae prominent; eyes not very prominent, of moderate size, ovate subreniform in outline, in length slightly (♀) or distinctly (♂) longer than the infraocular sulcus; antennae somewhat longer than the head and pronotum together. Pronotum deplanate dorsad, the caudal transverse sulcus rather deeply impressed, the metazona quite broad; cephalic margin very slightly angulate, the caudal margin acute (♂) or rectangulate (♀), lateral shoulders noticeable only on the metazona and there rather heavy and well rounded; metazona about twice the length of

the prozona, median carina distinct, more elevated on the prozona than on the metazona; lateral lobes distinctly deeper than long, impressed mesad, ventro-caudal angle well rounded. Tegmina four and one-half times as long as the greatest dorsal length of the pronotum, the greatest width, which is nearly median when the tegmen is flattened, being equal to the length of the pronotum, the distal third of the tegmina extending caudad of the apex of the abdomen; costal margin with the expansion broad and low, the distal fourth decidedly arcuate, the apical portion narrowed and the apical margin oblique-truncate, the true apex well rounded. Wings moderately broad, the width being about three-fifths of the length, the shape hardly falcate; costal margin arcuate in the distal fourth; humeral field with the apex well rounded acute-angulate; axillary field with the margin

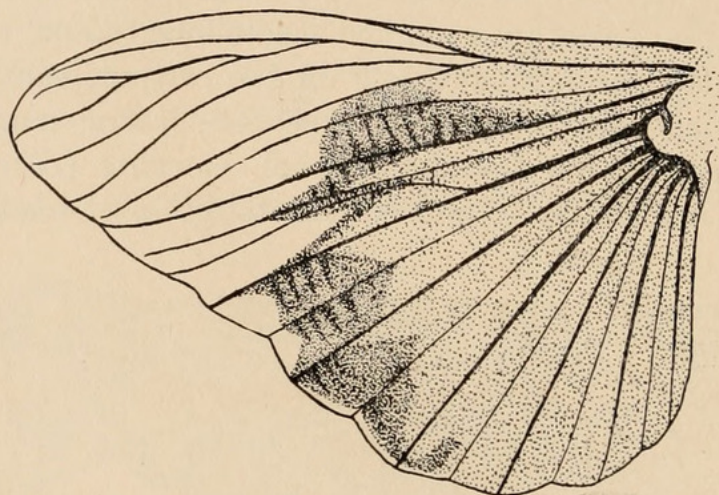


Fig. 14.—*Circotettix splendidus* n. sp. Wing.. ($\times 5$.)

very slightly arcuate, not at all lobate; posterior axillary vein with its ramus paralleling the anterior ulnar vein very closely for a considerable distance or by variation coalescing with it mesad for the length of a single cell; radiate veins considerably thickened. Caudal femora somewhat slender, the ventral carina arcuate, sublamellate; caudal tibiae with nine to ten spines.

General color cream strongly and conspicuously speckled with numerous annular and quadrate spots of olive, becoming blackish on portions of the male type. These maculations are distributed roughly as follows: three transverse poorly defined and broken bars on the tegmina, the median narrower than the others; a central patch on the disk of the prozona and cephalic portion of the metazona, obsolete caudad; sprinklings on the occiput, genæ and face; several rather solid blotches on the lateral lobes of the prozona, a postocular

bar on the head and some mottlings on the pleura; three more or less distinct annuli on the lateral, internal and dorsal faces of the caudal femora, the genicular region of similar coloration. Ventral sulcus of the caudal femora blackish except for a distinct pale pregenicular section; caudal tibiæ glaucous blue (paler in the female than in the male), blackish at the genicular extremity with a pale patellar spot and a distinct pale pregenicular annulus. Eyes raw umber. Wings with the disk citron yellow, apex hyaline, the longitudinal veins more or less brownish, the cross veins and often some of the longitudinal veins cream, transverse band well indicated but with rather indefinite boundaries and very weak at the posterior anal vein, hardly following the caudal margin.

Measurements.

	♂	♀
Length of body,	28 mm.	27 mm.
Length of pronotum,	6.2 "	6.5 "
Length of tegmen,	29 "	30 "
Length of caudal femur,	13 "	15 "

The types alone have been examined.

The special collection by the junior author was taken toward noon on the shady path leading to the top of Mt. Lowe. It did not seem particularly vigorous and was captured before its flight and clatter could be noted.

Anconia integra Scudder.

This desert-loving species was taken at three localities: Cottonwood, September 9, two males; Las Vegas, Nevada, August 10, seven males, one female, one immature individual; Kelso, August 12, one male; Indio, July 29, seventeen males, four females.

The series exhibits a considerable amount of individual variation in size, at least in the male sex, while the color variations are extensive as usual in the species. Specimens with green or very pale greenish in their coloration comprise half (Las Vegas) or slightly less than half (Indio) of the larger lots, while the greenish individuals from both of the localities are more maculate than is the case with greenish individuals from Arizona. The Indio and Cottonwood individuals are as a rule more uniformly maculate than the Las Vegas specimens. The decussate pronotal markings are present more or less distinctly in more than half the series. The Kelso individual has the entire body and proximal portion of the tegmina chalky-white washed and lined with pinkish-red.

The range of the species is now known to extend from Las Vegas, Nevada, and Death Valley, California, to Indio and Yuma, and from the western portion of the Mohave Desert to at least the vicinity of Tucson.

Heliastus californicus (Thomas).

A single female of this species taken at Pasadena, May 23, 1898, by Fordyce Grinnell, Jr., has been examined. It is inseparable in structure from San Diego individuals, but is decidedly different in coloration, being hoary whitish with a little buff washing and marked with umber, instead of being wholly deep wine-red with faint maculations as in four individuals from the latter locality. The color adaptation of this species appears to be as great as or even greater than in *H. aridus*.

Heliastus aridus (Bruner).

This species seems to make its appearance as the true deserts, both Upper and Lower Sonoran, are reached, encroaching perhaps in less desert-like surroundings in the San Jacinto Mountains.

After comparing the original measurements of *H. californicus* and *aridus* and examining a large series of material, although unfortunately containing few *californicus*, it appears that several of the best characters for separating the two species have been overlooked. The pronotum of *H. californicus* is considerably more expanded laterad, and the whole width of the thorax at the insertion of the median limbs is considerably greater in proportion to the length than in *aridus*, while the caudal femora are much slenderer and more elongate in *aridus*.

The length of the tegmina, a character previously used in a diagnostic sense, appears to be quite reliable, but the other differences given here are probably of greater importance.

The following measurements of individuals of *californicus* and *aridus* may prove of interest:

H. californicus.

	Length of body. mm.	Length of pronotum. mm.	♀	
			Length of tegmen. mm.	Length of caudal femur. mm.
Southern California, Type (from Thomas), . . . . .	....	....	20.3	12.7
San Diego, Cal.,	20.5	5.4	20.6	12.6
♂				
San Diego, Cal.,	15	3.2	14.5	8.7

H. aridus.

	Length of body. mm.	Length of pronotum. mm.	♀ Length of tegmen. mm.	Length of caudal femur. mm.
Albuquerque, N. M.				
Type (from Bruner),	27	5.1	25	14.5
El Paso, Tex.,	29	5.5	26.5	14.8
El Paso, Tex.,	29	5	24.3	14

			♂ Length of tegmen. mm.	Length of caudal femur. mm.
Albuquerque, N. M.,				
Type (from Bruner),	15	3	17	9
El Paso, Tex.,	18.1	3.5	18.5	10.8
El Paso, Tex.,	17.5	3.6	18.7	10.9

The series examined in this connection embraces the following localities: Kenworthy, San Jacinto Mountains, 5,000 feet elevation, June 9, F. Grinnell, one female; Dos Palms, Santa Rosa Mountains, 3,500 feet, May 26 to June 1, F. Grinnell, five females; Kelso, August 12, one male; Cima, August 12, two males; North Range, Providence Mountains, August 12, four males, one female; foothills Bird Spring Mountains, Cal., August 11, one female; same locality in Nevada, three males, one female.

The individuals from Kenworthy and Dos Palms are quite peculiar in coloration, being shades of pale ochraceous gray with well-defined brownish and blackish maculations, occasionally involving nearly the whole of the disk and dorsal halves of the lateral lobes of the pronotum. The other individuals are very similar in color to specimens from the desert regions of Arizona, New Mexico and western Texas.

The previous Californian records of the species are from Panamint Valley and Claremont. This latter may refer to *H. californicus*.

Heliastus minimus Scudder.

This little known species is represented by material from near the foothills of the Bird Spring Mountains, both in California and Nevada, a series of seventeen males, eight females and one immature specimen being taken on August 11. Three individuals of each sex were also taken the same day in Nevada, immediately over the line from Lyons, California.

All the specimens examined are distinctly, some very considerably, larger than the measurements given by Scudder of typical material from Palm Springs, California, but in every other respect the individuals

before us are typical. Measurements of the extremes of the series in hand are as follows:

	♂	♂	♀	♀
	mm.	mm.	mm.	mm.
Length of body,	13	14	21.5	23.3
Length of pronotum,	2.5	2.7	4	4.7
Length of tegmen,	12.3	13.3	19.3	21.5
Length of caudal ferum,	8.9	8.9	12	13.6

Specimens examined by the senior author¹⁵ from Bill Williams Fork, Arizona, were also noted as being larger than the type measurements.

The coloration varies chiefly in the depth of the buffy base color, some individuals having considerable reddish, chiefly on the proximal portion of the tegmina and the disk of the metazona. The femoral bars are decidedly marked in all the specimens.

The specimens were all collected among dry grass growing in deep sand near the border of a borax flat. Nowhere else was the species to be found, but in this location it was plentiful. The species has a quick short flight, and when resting on the sand often appears to rely on its protective coloration. The situation in which the specimens were taken was frightfully hot.

The species is only known from Palm Springs, Colorado Desert, California, Bill Williams Fork, Arizona, and foothills of the Bird Spring Mountains, near the California-Nevada boundary.

***Tytthotyle maculata* (Bruner).**

This peculiar locust was taken at three localities, and in every instance it frequented volcanic rock fragments, flying long distances, somewhat like species of the genus *Schistocerca*, alighting precipitately on the bare volcanic rocks, and almost invariably climbing upon one of the higher fragments. The insects were, however, easily approached when due caution was used.

The series comprises six males and two females, taken as follows: Kelso, August 12, one male; North Range, Providence Mountains, August 12, one male, one female; foothills Bird Spring Mountains, August 11, four males, one female, specimens being taken in both California and Nevada.

In size the specimens exhibit but slight variation, but in color the prevailing tone is pinkish-brown in some specimens and drab-gray in others, the maculations being variable in intensity and pattern. The caudal angle of the disk of the pronotum varies from rectangulate

¹⁵ *Trans. Kansas Acad. Sci.*, XIX, p. 224.

to distinctly acute-angulate. The bluish cast of the wings was very noticeable in flight. The previous records of the species are from Needles, California, and Bill Williams Fork and Yuma, Arizona.

Dracotettix californicus Bruner.

Four specimens apparently belonging to this species have been examined in this connection. These are an adult male from Echo Mountain, 2,700 to 3,500 feet, taken August 8; an adult male from Hemet Peak, 7,065 feet, San Jacinto Mountains, taken June 4 by F. Grinnell, Jr.; an adult female from the South Fork of the Santa Ana, 6,400 feet, San Bernardino Mountains, taken July 20, 1906, by J. Grinnell, and an immature female taken on Mt. Lowe, 4,300 feet, on August 8. In addition to these specimens typical material of the allied species, *D. monstrosus* and *plutonium*, from the collection of the U. S. National Museum have been examined.

Logically *D. californicus* appears to be the intermediate connecting the other types of the genus (*plutonium* and *monstrosus*) and at present it is not clearly defined. The general form of the fastigium, shorter proportionately in this than in the allied species, of the pronotal carina, of the caudal femora, and the general appearance of the insect seem to be the most useful points, the color of the internal face of the caudal tibiae and the form of the accessory carinae on the occiput being of little or no use. The material before us in addition to the above listed specimens consists of the following:

D. monstrosus, Los Angeles County, two males. San Diego, one immature female. Claremont, one female. "Cal.," one female.

D. plutonium, Panamint Valley, one male, *type*. Coso Valley, one female, *type*.

D. californicus, Claremont, one male. Mountains near Claremont, one female. San Bernardino County, two males.

Of the series of eight specimens of *californicus* before us, one male from San Bernardino County and the San Bernardino Mountains female have the internal face of the caudal tibiae uniform purplish, in one male from the San Jacinto Mountains there is a trace of reddish and in the remainder the red is marked, at least distad.

The previous records of the species are from Santa Cruz Mountains, Gilroy and Napa, California, and southern Arizona.

Schistocerca vaga (Scudder).

A single male from Altadena, August 8, and two females from Pasadena, taken April 23 and June 18, 1898, by F. Grinnell, Jr., are in the series before us.

The species has been recorded from a number of localities in southern California.

Schistocerca venusta Scudder.

At Indio, on July 29, this species was very plentiful in tall weeds along a watercourse, two males and three females being taken. A female from an elevation of 3,000 feet in the San Gabriel Mountains, taken October 9, 1908, by F. Grinnell, Jr., is also in hand. The pronotal stripe is narrower in the San Gabriel Mountains individual than in the female from Indio, while the specimens from the latter locality, and to a lesser degree in the San Gabriel individual, are much paler than Huachuca Mountains, Arizona, representatives. The species has previously been recorded from Palm Springs, Indio, Tulare and Gazelle, California, while specimens from San Diego and Cuyamaca, San Diego County, are also before us.

Schistocerca shoshone (Thomas).

Three males of this species were taken at Las Vegas, Nevada, August 10, where the species was found in clumps of green weeds near water. The habits and habitat of this species seemed to be exactly the same as those of *Schistocerca venusta*, but we have never found the two at the same place.

The only previous records of the species from Nevada are either indefinite or from the northern section of the State (Truckee Valley).

Hesperotettix festivus Scudder.

At Indio this species was abundant on July 29, a series of eighteen males and twenty-five females being taken. At Cottonwood, September 9, the species was found in small numbers on rabbit-weed, two males and one female being taken, while a single female was secured in the Arroyo Seco at Pasadena, August 1. At Las Vegas, Nevada, August 10, a series of twelve males and seven females was secured.

There is a striking amount of individual variation in size in both sexes of the Indio series, but particularly in the female. Of the same series, six males and six females are decidedly brownish in color or show a marked tendency in that direction. Both Cottonwood males are decidedly brownish, while the single female is green. All the green individuals in the series have more or less distinct pinkish or pinkish-red femoral annuli, the majority of the brown or brownish specimens having these obsolete. The green of the Las Vegas series is pale and decidedly yellowish, all from that locality being uniformly colored. The Cottonwood female has a very faint bluish cast to the entire tegmina. The median whitish cephalic and pronotal line is bordered laterad with blackish or dark green in a number of specimens.

The only previous Californian records of the species are from Los Angeles County and Indio.

Æoloplus tenuipennis Scudder.

A single male of this species was taken at Summit House, September 3. The measurements—length of body 16 mm.; length of pronotum 3.5; length of tegmen 13; length of caudal femur 8.3—are slightly larger than those of the type as given by Scudder.

The record of this species from Tucson, Phoenix and Yuma, Arizona, made in a recent publication by the authors,¹⁶ requires correction when comparison of the Summit House specimen of typical *tenuipennis* is made with the Tucson, Phoenix and Yuma specimens, all formerly placed under that name being richly and contrastingly colored individuals of *Æ. arizonensis*.

The only previous published records of this species are from Fort Grant (type) and Bill Williams Fork, Arizona.

Æoloplus arizonensis Scudder.

This species appears to be the commonest one of the genus over a considerable extent of country, ranging from southeastern Arizona¹⁷ to southern Nevada and the Colorado Desert. The California and Nevada series before us consists of seventy-seven specimens distributed as follows: Indio, July 29, twenty-seven males, twenty-six females; Cima, August 12, two females; Las Vegas, Nevada, August 10, ten males, twelve females. This species exhibits a remarkable amount of variation in size and considerable diversity in coloration; sometimes, however, a series from one locality will be more uniform in this respect than an equally large one from another region. The Las Vegas series, while showing the instability of the species in these two respects, averages smaller and is more uniform than the Indio series, which shows great diversity in both sexes. Some have the body very pale buffy without distinct markings save on the femora, while others have the stripes on the head and pronotum moderately distinct, the ground color varying greatly in depth. The femoral bars are distinct in all the specimens, but the color of the caudal tibiae may be purplish (solferino, rose purple, lilac or heliotrope purple), pale glaucous, a mixture of the two or some one of several tones of either.

The Las Vegas series has rose purple or a shade of it the predominating color of the caudal tibiae, while the Indio series has glaucous the color in all the specimens. The two Cima specimens are quite small

¹⁶ *Proc. Acad. Nat. Sci. Phila.*, 1908, p 394.

¹⁷ See above under *Æ. tenuipennis*.

and dark in color, the pattern being strongly marked and the tibiae purplish in color.

In the locations where this species was captured it was found plentiful among desert plants, excepting at Cima where individuals were scarce and were found in thick thorny bushes.

The previously published records of the species are from Fort Whipple and Yuma, Arizona, and the Mohave Desert.

***Æoloplus oculatus* Scudder.**

This interesting species, previously known only from Mohave, Arizona, is represented in the series before us by six specimens, two males and four females, taken at Cottonwood, September 9. The prominent character of the eyes, mentioned by Scudder in his original description of the species which was based on a unique male, is by no means as pronounced in the female as in the male sex, although when compared with females of *Æ. arizonensis* the same sex of this species can be separated with little difficulty. The species is quite as variable in size as most of the others of the genus, but the specimens before us are quite constant in coloration.

These insects were fairly plentiful in a low white desert bush, which they would not leave and were in consequence difficult to capture.

***Melanoplus herbaceus* Bruner.**

At Indio, July 29, this species swarmed in an irrigated alfalfa field and in high weeds, a series of twelve males and nine females being taken. A pair of this species was also taken on vegetation on irrigated land at Las Vegas, Nevada, August 10. This is one of the most active species of the genus *Melanoplus*.

The Indio males are nearly equally divided between the typical form and that called *flavescens* by Scudder, while several specimens are perfectly intermediate in character. All of the specimens are in the green phase with more or less distinct postocular bars or no traces of the same, except one in the brown phase and several approaching the same.

The species has previously been recorded from California at San Diego and Indio, this constituting, however, the first Nevada record.

***Melanoplus devastator* Scudder.**

The collections made in California in 1907 contain an extensive series of this very variable species, representing the following localities: Mill Valley, August 23, nine males, nine females; Santa Cruz Mountains, August 28, one male, one female; Merced, August 30, thirteen males, ten females; Raymond, September 3, five males, thirteen

females; Summit House, September 3, one male, three females; Sentinel, August 31 and September 1, seventeen males, thirty-five females; Pasadena (San Rafael Hills), August 1, ten males, fifteen females; Altadena, August 8 and 25, six males, two females; Miramar, July 31, one female; Alamitos Bay, July 31, nine males, seven females; El Toro, August 20, four females; Coronado Beach, August 15, one male, one female; Santa Catalina Island, August 3 and 7, three males.

This series exhibits such a great amount of variation in size and color, and to an extent in minor structural characters, that we have not attempted to place the specimens in the four forms of the species recognized by Scudder, as it appears probable that more than four types must be recognized if all the variants are distinguished by name. The desirability of doing this seems questionable, at least at the present time.

The smallest specimens in the series are from Summit House, Pasadena and Altadena, while the largest are from El Toro, Alamitos Bay, Merced and Raymond. One male and four females taken at Stanford University, October 17, 1903, by Fordyce Grinnell, Jr., have also been examined.

Melanoplus aridus (Scudder).

Three males and one female of this species were taken at Cima, August 12.

When compared with Florence, Arizona, individuals of both sexes, the Cima specimens are found to agree very fully in all points except the position of the tegmina, these being attingent or at least sub-attingent in the Arizona specimens and considerably separated in the California individuals.

This is the first record of the species from California.

The specimens were taken in the tree yucca area where they were scarce. They were found in a hilly location inhabiting the lowest bushes.

Melanoplus varicus Scudder.

Four males and three females from elevations between 4,000 and 5,600 feet on Mt. Lowe, taken August 8 and 25, and a single female from the slopes of the San Rafael Hills at Pasadena, taken August 1, are provisionally referred to this species, described from specimens from Tehachapi, Kern County, California, unique to this writing.

The Mt. Lowe specimens appear to differ from the original description in having the furcula of the male hardly divergent, in fact parallel in several of that sex, while the cerci appear to be slenderer at the apex

than in the types, although of essentially the same form. The interspace between the mesosternal lobes appears to be broader and less longitudinal in both sexes of the Los Angeles County material. It is possible that a comparison of typical material with the series in hand may make necessary their separation.

There is a considerable amount of individual variation in size, which is not at all correlated with any particular elevation. The coloration is somewhat deeper in several individuals than in the others, but it is quite characteristic in all. The species was not common.

***Melanoplus sonomaensis* Caudell.**

A single pair of this species was taken in a garden at Santa Cruz, California, August 28. The only previous record of the species is that of the types from Glenellen, Sonoma County, California.

In the garden the species was noticed to be extremely plentiful, especially about the strawberry bed.

***Melanoplus gracilipes* Scudder.**

A single female from Miramar, July 31, is referred to this species, which was previously known only from Los Angeles. The individual was taken near the shore, along the border of a field of dry trampled grass. Further extensive search failed to reveal any other specimens.

***Melanoplus pacificus* (Scudder).**

An interesting series of twenty specimens of this species were collected in the Yosemite National Park, between 4,000 and 6,000 feet elevation, at the following localities: Yosemite Valley, 4,100 to 4,500 feet, September 1, two males, one female; Sentinel, August 31, two males, six females; Eight-Mile Camp, September 1, one male, four females; Grouse Creek, September 1, one male, one female.

When compared with a pair of this species from Sissons and Dunsmuir, Siskiyou County, California, the Yosemite males have the caudal margins of the cerci more thickened and terminating rather abruptly about two-thirds the distance from the base, the apical third being equally slender in males from both localities. A single male in the Academy collection from the Yosemite Valley, date and collector unknown, fully agrees with the larger series in the above mentioned character.

The coloration shows little variation except in the depth of the light and dark colors, most of the palest individuals being from Sentinel. The postocular bar is strongly marked in all the males and a number of the females, being distinctly or hardly indicated in the remainder of the latter sex. In several females the postocular bar is represented

only by a very narrow and broken line bordering the ventral side of the lateral carinæ. In size there is considerable individual variation, females from Eight-Mile Camp alone showing five millimeters difference in the length of the body.

At Sentinel the specimens were all captured in a small area of herbs beside the Merced River, while at Eight-Mile Camp and Grouse Creek the specimens were taken in a forest of conifers. The insects were active but heavy and easily captured, although the series taken at Sentinel was secured only after long and continued search.

The previous records of the species are from Dunsmuir, Edgewood, Mt. Shasta and Sissons, Siskiyou County, Shasta County, Santa Cruz Mountains, and mountains near Lake Tahoe, California.

Melanoplus borckii (Stål).

One male and two females of this species were taken on Mt. Tamalpais, August 23, one female at 1,500 feet elevation, the other individuals at 2,100 feet. The former specimen was found along the railroad track, while the latter were on the ground among huckleberry bushes. The individual from 1,500 feet elevation has a most peculiar coloration, the general tone of the insect being brownish black with a rather broad arcuate bar of coral-red crossing the dorsal portion of the lateral lobes of the pronotum. The ridge of the metathoracic episterna is yellowish as in normally colored specimens, while the dorsal face of the caudal femora is ochraceous-rufous, blackish proximad and distad with the median bar indicated on the internal half.

The only exact localities from which this species has been recorded are in the coast region of California between Sonoma County and Los Angeles.

Melanoplus tenuipennis Scudder.

Four adult and one nearly mature female taken between June 28 and July 20, 1906, at elevations of from 6,200 to 6,400 feet, on the South Fork of the Santa Ana River, in the San Bernardino Mountains, by Dr. Joseph Grinnell, are now before us. They agree quite well with Scudder's description of the species, which is very close to *M. missionum*. The coloration is fairly constant except for the ventral extension on the prozonal lobes of the blackish postocular line, as well as the variable character of the lateral face of the caudal femora. The latter may be nearly solid blackish, yellowish-green darkened distad and dorsad or faintly oblique fasciate. Very weak pregenicular annuli are present in one individual.

The species has been recorded from Guadalupe and Los Angeles,

and Monterey, Los Angeles, San Bernardino and Kern Counties, California.

Melanoplus missionum¹⁸ Scudder.

A series of seventeen specimens of this species are in the collection before us, all taken in a comparative small area. The localities represented are the following: Arroyo Seco at Pasadena, one male, July 20, F. Grinnell, Jr., one female, August 1; Arroyo Seco, San Gabriel Mountains, elevation 3,000 feet, October 8, F. Grinnell, Jr.; Altadena, August 8, one male; Mt. Lowe, 4,000 to 5,600 feet, August 8, six males, seven females. There is considerable individual variation in size, specimens from the highest elevation on Mt. Lowe showing the following extremes:

	♂	♂	♀	♀
	mm.	mm.	mm.	mm.
Length of body,	15.8	19	25	26.5
Length of pronotum,	4.2	5	5.2	6
Length of tegmen,	3.2	3.8	3.5	3.8
Length of caudal femur,	10.2	11.8	13	14

The exposed portion of the tegmina varies considerably in length, in one case hardly more than half the average exposed area being visible. The general coloration shows considerable variation, ranging from quite uniform greenish yellow to dull olive and ochraceous-buff and vandyke-brown. The last mentioned type predominates, the females, however, being much duller than the males. The yellow type is represented by one female from 3,000 feet elevation in the Arroyo Seco, while the single olive specimen is from the Arroyo Seco at Pasadena. The yellowish postocular line is distinct in the majority of the specimens and faintly indicated in the remainder. The femoral bars are distinct in all the males and faintly indicated in all the females except the greenish-yellow specimen, which also has the caudal tibiae yellowish externally and glaucous internally instead of nearly uniform glaucous as in the others. A more or less distinct yellowish pregenicular annulus is present in the majority of the series.

Specimens were never taken in numbers, but single individuals were occasionally noticed.

The only previous record of the species is from Los Angeles. This reference probably should stand as Los Angeles County.

Melanoplus fuscipes Scudder.

Two females of this species were taken in the San Gabriel Range

¹⁸ The senior author's *Edaleonotus truncatus* (Ent. News, XVIII, p. 353) from the San Gabriel range near Claremont, California, is a synonym of this species.

on August 8, one at an elevation of 4,400 feet on Mt. Lowe, the other in Rubio Canyon, between 2,200 and 3,000 feet.

The specimens, while quite similar in coloration except for a rufous tone to the lighter color of the large individual, show considerable individual variation in size, the measurements being as follows:

	Length of body.	Length of pronotum.	Length of tegmen.	Length of caudal femur.
	mm.	mm.	mm.	mm.
Rubio Canyon,	18.5	4	3.5	10
Mt. Lowe,	22	5.5	4.5	12

The previous records of this species are from localities along the coast and coastal valleys of southern California, from between Luis Obispo and San Simeon Bay south to San Diego County and at least as far east as Claremont. The species has also been recorded from San Bernardino County, but from which portion of that quite diverse area is not mentioned.

In habitat and actions these specimens greatly resembled *Melanoplus missionum*.

***Melanoplus ablutus* Scudder.**

A single male of this species was taken at El Portal, August 30, at an elevation of 2,050 feet on a steep mountain side, among dry leaves, under manzanita and other bushes. The specimen was taken at daybreak, and no other Orthoptera were noted at that time.

The antennæ of this individual are quite short, not quite four millimeters long and slightly less than half the length of the caudal femur, the tips being perfect and unbroken. In the type measurements Scudder gives the length of these appendages as six and one-half millimeters or more than two-thirds the femoral length. In every other character the specimen in hand is perfectly typical. The type locality is Wawona, Mariposa County, California.

***Melanoplus nanus* Scudder.**

One male and two females of this species, taken at Mill Valley, August 23, are in the series. They are closely related to the following species and require considerable study for their proper separation. The shorter and apically broader cerci and more divergent furcula are of the greatest comparative value.

The species was found on a dry grassy hillside.

The original and only previously published records of the species are from Mill Valley, San Francisco, Berkeley and Baden, San Mateo County, California.

Melanoplus ligneolus Scudder.

Two males and a single female of this species were taken at 2,100 feet elevation on Mt. Tamalpais, among low bushes.

Both this and the preceding species were extremely scarce.

The previous records are from Berkeley and Benicia, California.

Melanoplus cinereus Scudder.

An interesting series of thirty-three specimens of this species from the following localities is contained in the collection: Sentinel, August 31, one male; Pasadena, August 1, nine males; Altadena, August 8, one male, one female; Rubio Canyon, 2,200 to 3,000 feet, August 8, three males; Alamitos Bay, July 31, four males, one female; Coronado and South Coronado Beach, August 16, five males, one female; Tia Juana, August 16, three males, one female; Santa Catalina Island, August 7, two males, one female.

The series exhibits a surprising amount of variation in size, this being to a great extent individual, but in a measure apparently due to geographic factors. Average males from the localities represented measure as follows:

	Length of body.	Length of tegmen.	Length of caudal femur.
Sentinel,	20.5 mm.	15.5 mm.	10.5 mm.
Pasadena,	17.5 "	16.2 "	11 "
Altadena,	16.5 "	15 "	10.5 "
Rubio Canyon,	19.2 "	15.8 "	10.8 "
Alamitos Bay,	20.8 "	18.2 "	12.5 "
Coronado Beach,	16.8 "	16 "	11 "
Tia Juana,	16.5 "	14.8 "	10 "
Santa Catalina Island,	16.5 "	13.5 "	10 "

The cerci and furcula show a number of modifications of the essential type of the species, but none of the specimens are typical of the closely related *M. cyanipes*, although this is approached by certain individuals. The coloration varies considerably, the Sentinel, Pasadena, Altadena and Rubio Canyon series being darker than the Coronado Beach and Tia Juana specimens, while the Alamitos Bay and Santa Catalina Island individuals are nearly intermediate, although nearer the dark type. The Tia Juana and Coronado Beach females are very pale, as is also the case with one male from the latter locality.

This is essentially a species of the drier sections, and although a common species it was never found to be gregarious.

Melanoplus complanatipes Scudder.

Three males and one female from Cottonwood, September 9, and

one female from the foothills of the Bird Spring Mountains, Nevada, August 11, are inseparable from this species, previously known only from Cape San Lucas, Lower California, and Sonora, Mexico.

The appendages of the males are identical with Scudder's figure, but it would seem as if the typical material was shrunk from immersion in spirits, as Scudder states the figured male "is . . . somewhat distorted by preservation in spirits," and the same medium has apparently rendered some points of the coloration obscure. The dimensions of a Cottonwood pair and the Nevada female are as follows:

	Length of body. mm.	Length of pro- notum. mm.	Length of tegmen. mm.	Length of caudal femur. mm.
Cottonwood, ♂	21	4.5	19.5	12
Cottonwood, ♀	25.5	5	22.2	13.2
Foothills Bird Spring Mountains, ♀	27	6	25	14.5

The postocular bar is faint in one specimen and distinctly marked in the others, while the entire dorsum, except for a pair of narrow lateral more or less distinct yellowish carinal lines, is sprinkled and clouded with umber. The caudal femora bear traces of transverse bars, in fact quite distinct ones dorsad, while the ventral and internal faces of the same portions are orange or orange-red. The caudal tibiae are glaucous, varying from very pale to quite deep in shade.

This was one of the extremely vigorous and scarcer desert species. In habits it closely resembled *Melanoplus bowditchii*, being quite as active and shy.

Melanoplus marginatus form *pauper* Scudder.

At Ahwahnee, September 3, this interesting insect was found common in a rank growth of high tarweed, a series of six males and seven females being taken.

Considerable individual variation in size is exhibited by these specimens, the extremes being as follows:

	♂ mm.	♂ mm.	♀ mm.	♀ mm.
Length of body,	15.5	17	19	22.8
Length of pronotum,	3.3	4	4	4.5
Length of tegmen,	4	4.2	4.2	5.2
Length of caudal femur,	8.7	10	10.2	11.2

In general coloration some specimens are distinctly darker than others, but the pattern is essentially the same in all the series.

The species has previously been recorded from Natoma Vineyard, Folsom, Atwater, Fort Tejon, Chico, Guadalupe and southern California.

Melanoplus femoratus (Burmeister).

This species was found in numbers at both Sentinel, August 31 and September 1, and Mariposa Grove, September 2, ten males and nine females being taken at the former locality and seven males and two females at the latter.

The specimens average decidedly smaller than individuals from the eastern United States, while the amount of contrast of the yellow postocular bars and of the ventral half of the caudal femora is quite variable, several of the males being very strikingly colored.

The previous Californian records of the species were from Mt. Shasta district and Los Angeles. This latter record is probably meant to cover the entire county, as it is hardly possible that this species could be found in the vicinity of Los Angeles.

TETTIGONIDÆ.

Hormilia elegans Seudder.

Three adult males and four immature individuals of this species were taken from greasewood at Cottonwood, September 9. The specimens were found only by long and constant search. They flew from one greasewood bush to another, but were easily approached and captured, apparently relying on their coloration for protection. These individuals possess strongly contrasted maculations, the base green being deep in two males, while the third has the dorsal section of the tegmina blackish-brown, the white spots, which are decided, distinctly outlined and regularly placed, being washed with pale greenish in one individual. The darker portions of the limbs are olive-brown in the male with blackish-brown on the tegmina. In size the Cottonwood adults are about equal to specimens from Florence, Arizona.

This is the first record of the species from California.

Seudderia mexicana (Saussure).

Three California males of this species have been examined, one from Avalon, Santa Catalina Island, taken August 7 by Hebard, another from Pasadena, taken July 28, 1899, by F. Grinnell, Jr., and a third from Santa Monica, taken August 1, 1906, by the same collector.

The previous Californian records of the species were from Los Angeles, Coronado and Claremont. The single specimen from Avalon

was found in the afternoon, resting on a frond of a palm growing in a garden.

***Scudderia furcata* Brunner.**

A single male of this species was taken at Ahwahnee, September 3. This is the most southern record for California. The insect was taken in a rank growth of tarweed.

***Conocephalus*¹⁹ *spinosus* (Morse).**

Three males and one female of this species were taken on salt marsh vegetation at South Coronado Beach, August 16. In life the specimens were deep green in color. The species was described from Coronado, and has not been reported from elsewhere. At the time these specimens were taken adults were extremely scarce.

***Conocephalus occidentalis* (Morse).**

In a meadow of deep rank grass at Sentinel, Yosemite Park, August 31, five males and five females of this species were taken. At Mariposa Grove, September 2, three males and seven females were also taken, while at Mill Valley, August 23, two females were secured in a dry ditch. The females exhibit considerable diversity in the length of the ovipositor, the extremes, however, being well within those given by Morse, while the wings do not quite reach the apex of the abdomen in any of the males and range from one-half to three-fourths the length of the abdomen in the females.

One of the specimens taken at Mill Valley was caught ovipositing in a grass straw.

***Conocephalus vicinus* (Morse).**

Two males of this species were taken among grasses on sand dunes directly back of the ocean beach at Alamitos Bay, July 31.

***Neduba convexa* Caudell.**

Four males of this form were taken at 2,100 feet elevation on Mt. Tamalpais, on ground covered with leaves and bark. They were very quiet and when found could be picked up easily. One specimen is slightly smaller than the original measurements, the other three, however, being almost identical with the type male in dimensions.

The color form of the type male, viz., "light yellowish-brown," is not represented in the four specimens before us, two of these being red-brown and the others umber-brown. The abdominal pattern found in *N. carinata* is marked in the two red-brown males, hardly

¹⁹ For remarks on the use of this name in place of *Xiphidium* of authors see Rehn, *Proc. Acad. Nat. Sci. Phila.*, 1907, p. 389.

indicated in one of the brown males and no traces are present in the other. The lateral lobes of the pronotum are blackish-brown in all the specimens, but this is more extensive cephalo-ventrad in some than in others.

After comparison of the genitalia of this form with the figures of that of *N. carinata* we are forced to the conclusion that specific rank must be accorded *convexa*.

The type localities were Mt. Shasta and Napa County, California.

***Aglaothorax sierranus* n. sp.**

Types: ♂ and ♀: Yosemite Valley, 4,500 feet (♂) and Grouse Creek, 6,000 feet (♀), Yosemite National Park, California. September 1, 1907. Collected by Morgan Hebard. [Hebard Collection.]

Related to *A. diabolicus* (Scudder) from Monte Diablo, California, but differing in the somewhat shorter caudal femora, which are much less inflated proximad, and in the more decidedly and sharply dentate apex of the ovipositor. No doubt other differences exist in the male sex, but this cannot be determined until the male of *A. diabolicus* is known.

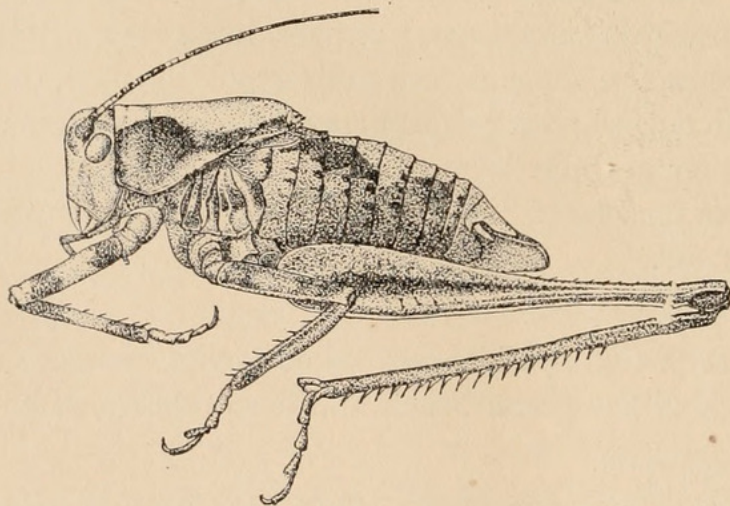


Fig. 15.—*Aglaothorax sierranus* n. sp. Lateral view of male type. (× 2.)

Size moderately large; form robust. Head well seated in the thorax, the interocular space very broad and mesad with a pair of more or less distinct converging rugæ which unite with the lateral margins of the fastigium; fastigium about equal to the basal antennal joint in width, narrowing ventrad, with a distinct very narrow sulcus on the dorsal surface terminating abruptly cephalad; eyes small, ovoid, quite prominent for their size; antennæ exceeding (♂) or at least as long as (♀) the body. Pronotum with the greatest width of the disk contained about one and one-half times in the length; cephalic margin

slightly arcuate emarginate (σ) or subtruncate (φ), caudal margin strongly arcuate; lateral carinae hardly marked cephalad, quite strong mesad and caudad, arcuate divergent then rounding to the caudal margin, the arcuation being more pronounced in the male than in the female, the greatest width of the metazona over twice the cephalic width of the same portion; median carina precurrent, weak; caudal portion of the metazona shallowly rugoso-punctate; prozona but little more than a fourth the length of the metazona, transverse sulcus shallow but distinct, not severing the median carina; lateral lobes with the greatest dorsal length half again as much as the depth, the caudal margin hardly (σ) or slightly (φ) sinuate. Tegmina of the male hardly projecting caudad of the pronotum, inflated. Abdomen considerably inflated proximad, tapering caudad, the segments moderately keeled dorsad; terminal dorsal abdominal segment of the male broad at the base, produced, somewhat depressed distad, the lateral margins subparallel caudad of the cercal emarginations, the distal margin sinuato-truncate; cerci robust and subequal proximad and mesad, tapering distad, the robust portion subscabrous, the entire length about half that of the terminal dorsal abdominal segment; infracercal plates projecting caudad of the terminal dorsal abdominal segment by nearly half the length of the latter, the lateral margins rounding to the apex which is at the internal margin; subgenital plate large, compressed, deep, projecting beyond the infracercal plates less than the length of the latter, the apical section carinate ventrad and with the apical margin arcuate on each side of the V-

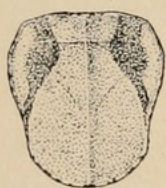


Fig. 16.

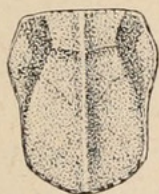


Fig. 17.

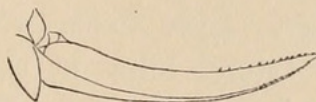


Fig. 18.

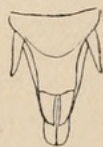


Fig. 19.

- Fig. 16.—*Aglaothorax sierranus* n. sp. Dorsal view of pronotum of male type. ($\times 2$)
 Fig. 17.—*Aglaothorax sierranus* n. sp. Dorsal view of pronotum of female type. ($\times 2$).
 Fig. 18.—*Aglaothorax sierranus* n. sp. Ovipositor. ($\times 2$)
 Fig. 19.—*Aglaothorax sierranus* n. sp. Dorsal view of apex of male abdomen. ($\times 3$)

shape which the plate there assumes; cerci of the female similar to those of the male; supra-anal plate strongly arcuate; ovipositor about two-thirds the length of the caudal femora, considerably arcuate, tapering, the apical portion of each margin armed with moderately

sharp erect teeth, those of the dorsal margin numbering about fourteen and those of the ventral margin about half that number; subgenital plate of the female moderately produced, subtrigonal, strongly arcuate in section, the apical margin obtuse. Prosternum armed with a pair of moderately long spines. Cephalic femora about two-thirds the dorsal length of the pronotum, moderately robust, the dorsal face armed with two spines cephalad and three to four caudad, the ventral margins unarmed, the cephalic genicular lobe with a single spine, the caudal unarmed; cephalic tibiae very slightly longer than the femora, the dorsal face with two spines, one tympanal, the other apical, the ventral margins each with seven spines. Median femora slightly longer than the cephalic femora, the dorsal face armed with six spines in the male, one being apical, a smaller number present in the female, ventral margins unarmed; median tibiae slightly longer than the femora, armed dorsad with three spines on the cephalic margin and five on the caudal, ventral margins each armed with eight spines. Caudal femora nearly two and one-half times the length of the pronotum, quite robust proximad, the distal third slender and subequal, the dorsal face of the inflated proximal section with numerous fine depressed spines, ventral margins unarmed; caudal tibiae slightly shorter than the femora; free plantula present in the caudal tarsi.

General colors of the male buff dorsad, clay color laterad and ventrad, of the female dull chocolate-brown. The face, greater portion of the lateral lobes of the pronotum, abdominal bars and annuli and clouds on the limbs shining seal-brown. The two proximal joints of the antennae are blackish beneath, while the remainder of the antennae are regularly annulate with buff and seal-brown, the buff annuli distinctly narrower than the seal-brown ones, the latter regularly increasing in length distad. Eyes hazel-brown. A bar on the ventro-caudal portion of the lateral lobes of the pronotum of the lighter general color of the respective sexes, while the caudal margin of the disk of the pronotum is narrowly checked with the darker color. The main abdominal pattern consists of lateral bars becoming evanescent laterad, broad and parallel on the three proximal exposed segments, on the next two segments arching laterad and returning to nearly the same degree of separation distad as proximad, the bars at the expansion and caudad of the same much weaker than cephalad. Male genitalia chestnut; ovipositor of the general colors mottled. Caudal femora marbled on the dorsal aspect, a conspicuous medio-longitudinal line, more or less undulate in character, of seal-brown present on the lateral face and extending the length of the inflated portion.

Measurements.

	♂	♀
Length of body,	23 mm.	25.5 mm.
Length of pronotum,	8.5 "	8.5 "
Greatest dorsal width of pronotum,	5.5 "	6 "
Length of caudal femur,	20.5 "	21 "
Greatest width of caudal femur,	4 "	4.6 "
Length of ovipositor,		15.5 "

A paratype male from Yosemite Valley and another of the same sex from Wawona, taken September 1, have been examined in addition to the types. The paratype male is slightly larger than the type male and has the pale general color darker, more vinaceous-cinnamon, while the Wawona specimen is similar to the type in size and is almost uniform pale cinnamon in color, the seal-brown limited to the femoral line and scattered clouds, spots and points, the pronotum being practically uniform except for the beading on the caudal margins. The antennæ are similar in pattern in all the specimens.

The two specimens taken in the Yosemite Valley were captured during the morning, hiding in the cracks in the bark of some tall fir trees. They were quiescent, apparently resting for the day. The individual taken at Grouse Creek was found on a steep hillside, among a very few low green plants growing in a conifer forest. The insect jumped about actively, but only for short distances. The Wawona representative was taken from the stem of a small shrub, where it was stridulating at dusk. Other specimens were heard in the forest, usually in low trees. The stridulation is remarkably faint for so large an insect, the sound produced being a weak zip-zip-zeeeeee repeated several times, reminding one strongly of the stridulation of *Orchelimum minor*.

Cyrtophyllicus chlorum Hebard.²⁰

The type of this recently described genus and species, taken at El Portal, August 30, is contained in the collection.

The original association of the genus with *Zacycloptera* Caudell is correct, although the number of apical spurs on the caudal tibiæ was there stated in a way liable to confuse, the number of one side of the tibiæ or of pairs being given and not the total for the limb.

Anoplodusa arizonensis (Rehn).

On August 11, while crossing the volcanic flats overgrown with greasewood at the foot of the Bird Spring Mountains of the McCol-

²⁰ *Ent. News*, XIX, p. 156, figs. 1-3.

lough range, on the Nevada side of the California boundary line, a specimen of this very rare species was flushed from a greasewood bush. It flew up in a way reminding one of the swift flight of a *Schistocerca* and did not alight for at least two hundred yards, when it perched on the top of another greasewood bush. The specimen was captured and proved to be the first known female of the genus. When compared with the male type of the species the Nevada specimen does not appear to be separable, such differences as do exist, as larger size and slightly different proportionate width of the fastigium, being easily attributable to sexual differences. The ovipositor curves distinctly but not at all decidedly ventrad, the apex being acute and the margins not spined. The measurements are as follows:

Length of body (exclusive of ovipositor),	25.5 mm.
Length of pronotum,	7.2 "
Width of pronotum (caudad),	4.5 "
Length of tegmen,	47 "
Greatest width of tegmen,	7 "
Length of caudal femur,	28 "
Length of ovipositor,	25.8 "

The coloration is much paler than in the type, although the pattern is essentially the same, all the paler spots and markings on the pronotum and tegmina being ivory white and the remainder of the surface pale yellowish buff, becoming yellowish on the distal portions of the femora and on the tibiæ, the darker portions of the tegmina being brownish-clay color becoming paler distad. The line pattern on the pronotum is essentially the same as and more distinct than in the type, while no green is present on the specimen.

The type locality and only previously published record of the species is Florence, Arizona.

***Eremopedes gracilis* (Rehn).**

An adult pair of this form was taken at Cottonwood, September 9, frequenting low growth, where they were much protected by their coloration. The tegmina of the male, projecting two and one-half millimeters beyond the pronotum, are considerably convex with the internal margin of the apex obliquely arcuate, the external margin straight with the apex rounded subtruncate, the tympanum being almost entirely hidden. The ovipositor of the female is slightly shorter than the length of the caudal femora, while the tegmina are minute pads, well hidden under the pronotum.

The terminal dorsad abdominal segment of the male is deeply and

acutely fissate mesad with a pair of acute finger-like lobes bordering the same. The supra-anal plate, which is visible ventrad of the incision of the abdominal segment, is acute-angulate. The cerci are slender, tapering, nearly straight, the apical portion substyli-form, the apex rather blunted, the usual tooth on the internal margin is hidden by the supra-anal plate when the cerci are together. The subgenital plate has a small median rectangulate emargination, the styles being extremely short.

The measurements of the two specimens are as follows:

	♂		♀
Length of body,	22 mm.	21	mm.
Length of pronotum,	5.5 "	5	"
Greatest caudal width of pronotum,	3.5 "	3.8	"
Length of exposed tegmen,	2.5 "		
Length of caudal femur,	18.5 "	20.5	"
Length of ovipositor,		19.5	"

It is seldom that one can take exception to any portion of the excellent work of Caudell in his study of the North American Decticinae, but to his assignment of this name to the synonymy²¹ we are compelled to disagree. No actual comparison was made, as far as we can learn, of Scudder's type of *E. albofasciata* and that of *gracilis*, and specimens examined at different times may be considered the same when real differences exist. The characters given by Rehn for separating *gracilis* from *albofasciata* hold true in the material before us, and as far as memory serves the type of *gracilis* was similar to the one in hand, which is undoubtedly adult, although Caudell assumed it to be immature. The bars on the head, pronotum and abdomen are broader in this form than in a number of New Mexican immature individuals of *albofasciata*, the size is less than that of Scudder's type and the caudal femora appear to be slenderer and are considerably longer in proportion to the ovipositor. The immature specimen from Phoenix, Arizona, which Caudell says is similar to the type of *gracilis*, is probably the same as the Cottonwood specimens, as it is quite probable that one form is limited to the Eastern Desert or Chihuahuan Tract and the other to the Western Desert or Sonoran Tract.

The type locality of *E. gracilis* is Bill Williams Fork, Arizona.

Idiostatus æqualis Scudder.

A single female of this species was taken in the Arroyo Seco at Pasadena, August 1, while two males, one adult and the other not

²¹ *Proc. U. S. Nat. Mus.*, XXXII, p. 339.

quite mature, taken at 6,000 to 6,500 feet elevation in Strawberry Valley, San Jacinto Mountains, July 17, by F. Grinnell, Jr., have also been examined. The Arroyo Seco specimen was beaten from low bushes.

***Clinoppleura minuta* Caudell.**

At Raymond, on September 3, this species was found swarming, invariably on the ground, especially in a stubble field. The insects jumped farther than any species of North American Orthoptera taken by us, but owing to their tremendous numbers a large series was easily secured. A series of fourteen males and thirty-one females was taken at this locality, a single female also being secured at Summit House the same date in a situation similar to that frequented at Raymond. The series contains several females which slightly exceed Caudell's maximum measurements for the caudal femur and ovipositor. There is considerable variation in the general shade of coloration in the series, some individuals being decidedly more testaceous than others, the usual dark area on the lateral lobes of the pronotum being hardly or only partially indicated in some of the pale specimens. The previous records of the species were from Ahwahnee, Calaveras and Raymond, California.

GRYLLIDÆ.

***Ellipes minuta* (Scudder).**

A single individual of this species was taken along the nearly dry bed of the Mohave River at Cottonwood, September 9. Although considerable beating was done but one specimen was found.

The species has been taken at Palm Springs, San Bernardino and Ahwahnee, California.

***Ectatoderus occidentalis* (Scudder)?**

A single male individual of this genus was taken at Cottonwood, September 9. We have assigned it provisionally to this species, originally described from damaged female specimens taken at Cape San Lucas, Lower California. The original description of Scudder's species is so brief and the sex differences of many species of this genus so great, that in the absence of females the determination is not at all positive. No relationship exists with *E. borealis* Scudder, known from California and New Mexico, the produced pronotum of the Cottonwood male suggesting that of *Liphoplus mexicanus* Saussure,²² but the tegmina are much shorter, rather different in character and the facial scutellum is not distinctly divided.

²² *Biol. Cent. Amer. Orth.*, I, pl. XI, fig. 37.

The measurements of the specimen are as follows: Length of body 7.2 mm.; length of pronotum 3.2; greatest width of pronotum 2.8; length of tegmina caudad of pronotum 1.5; length of caudal femur 4.3.

At dusk and later, this insect was heard on every side stridulating. It was found that the musicians were hidden at the roots of greasewood bushes where they were almost inaccessible. The single specimen was captured by suddenly pulling a small bush up by the roots, and luckily turning the insect out of his home. The stridulation was similar to that of the genus *Gryllus* but shriller, an incessant zeee-zeee-zeee. This ceased upon approach, even when the disturber was yards distant.

***Nemobius mormonius* Scudder.**

Two males and one female of this species were taken from grass beside a stream at Las Vegas, Nevada, August 10. The species was rather well distributed in this situation.

***Miogryllus lineatus* (Scudder).**

Two males of this species were taken at Las Vegas, Nevada, August 9, on an ore pile, where a colony of these were chirping incessantly. The type of the species was taken between Virgin River and Fort Mohave, Arizona.

***Æcanthus niveus* (DeGeer).**

A single male of this species was taken on geraniums after dark, August 3, on Santa Catalina Island. Three females from Stanford University, California, taken October 3 to 23, 1903, by F. Grinnell, Jr., have also been examined.

***Æcanthus californicus* Saussure.**

A single male from El Portal, taken August 30, and a female from Mt. Wilson, 5,000 feet elevation, San Gabriel Mountains, taken September 19 by F. Grinnell, Jr., belong to this species. The general color is pale ochraceous in the male and olive-green in the female, the male having the head, except the mouth parts, and dots on the pronotum red, the first and second joints of the antennæ are also reddish but duller, while the third to seventh or eighth are dark brownish fading distad. The female bears no red except a wash of red-brown on the two proximal antennal segments, the brownish area on the antennæ found in the male being present in the female as well. The El Portal specimen was taken at night in a tangle of bushes by means of a lantern.



Rehn, James A. G. and Hebard, Morgan. 1909. "An orthopterological reconnoissance of the southwest United States. Part III: California and Nevada." *Proceedings of the Academy of Natural Sciences of Philadelphia* 61, 409–483.

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